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# RATIONAL TREATMENT

OF

# Pulmonary Tuberculosis

BY

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*AUTHORIZED ENGLISH TRANSLATION*

FROM THE

*SIXTH, REVISED AND ENLARGED FRENCH EDITION*

PHILADELPHIA
F. A. DAVIS COMPANY, PUBLISHERS
1921

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# PART I.

# The Curability of Tuberculosis.

## CHAPTER I.

### TUBERCULOSIS AND PHTHISIS.

FROM the strictly medical standpoint the term pulmonary phthisis is one that lends itself to expansion beyond its ordinarily accepted meaning, for there exist pulmonary phthises of different types, the number of such types constantly increasing as we become able to differentiate, at least pathologically, ulcerative involvements of the lung that are not caused by true tubercle. Practically speaking, it is nevertheless an accepted fact that pulmonary phthisis constitutes true tuberculosis of the lungs, due to a micro-organism, known as the bacillus of Koch since this investigator discovered it in 1883.

To the physician the terms pulmonary tuberculosis and pulmonary phthisis are synonymous, tuberculosis being the cause of phthisis. Among the laity, however, a shade of difference in the meanings of these two expressions is still recognized. The phthisical subject or consumptive is one whose tuberculous condition is plainly apparent even to the uninitiated, while the tuberculous subject is a patient who is as yet phthisical only to the medical man. As the layman is accustomed to believing in the existence of phthisis only when the disease is apparent to every one, he will not always allow himself to be convinced of the gravity of the case when a physician diagnosticates pulmonary disease in

a patient who is as yet phthisical only in the medical sense, *i.e.*, who at the time is still only a simple tuberculous subject.

Since the difficulty experienced in securing early treatment of the tuberculous is actually dependent upon these varying shades of meaning in commonly used expressions, it is of prime importance to state correctly and propagate the wholesome truism that tuberculosis and phthisis or consumption are one and the same disease, and not the one a more advanced stage of the other.

As matters now stand the physician speaks of the condition generally as tuberculosis, and consequently is not always clearly understood by the patient and his relatives. With the word tuberculosis often thought of by the uninitiated as a mere scientific term, the patient may easily be lulled into a false sense of security, being only too ready to believe that tuberculosis, as a relatively benign condition, is entirely different from consumption, an irrevocably fatal disease.

Pulmonary phthisis no longer presents the mysterious aspect it formerly had of a disease resulting in "consumption" of the lungs without any immediately apparent cause. The origin, nature, and effects of the condition are definitely to be ascribed to the bacillus of Koch. From the knowledge that this tubercle bacillus is the cause of tuberculous disease, there has resulted among French physicians—and increasingly so, likewise, among the laity—a tendency to apply the term pulmonary bacillosis, or simply bacillosis, to the tuberculous disease, and the ordinary manifestations of tuberculosis have come to be frequently referred to as bacillary bronchitis, bacillary lesion of the lungs, etc., without it being thought necessary to specify a participation of the tubercle bacillus in the process.

Yet, in medical parlance, use of the term bacillosis is rather restricted to general manifestations, such as the pronounced tuberculous fevers which run the course of infectious diseases without exhibiting the pathological features characteristic of true tubercle.

The tubercle bacillus, when implanted in the lung, multiplies there and produces the so-called tuberculous lesions, to the progression of which soon contribute a host of other parasitic micro-organisms, in particular those of the pyogenic group. For a varying period of time, the disease stays localized, the patient remaining in a satisfactory general condition and apparently suffering only from a simple cold —a "neglected cold," as it is usually put. At this time he is still merely a "tuberculous" subject. Then the disease extends, the tissues soften, cavities form in the lung, general health suffers, copious expectoration becomes established, persistent fever sets in, and every one comes to realize that the patient is a consumptive.

At times tuberculosis is an acute disease, setting in with fever and prostrating the patient like typhoid fever or pneumonia. More frequently, however, it is a chronic disorder which becomes established in the guise of an ordinary cold. In the first instance, no apprehension that the case will be neglected need exist, for in any sickness associated with fever a physician is generally called.

The important thing is that a correct diagnosis should be made at this time. The cases of false typhoid fever, *i.e.*, of Landouzy's typho-bacillosis, are turning up more and more frequently as we are getting to know them better, and the patient's subsequent mode of life frequently depends upon whether such a diagnosis can or cannot be made. Many times, evidences of an earlier typho-bacillosis are

found in the histories of patients who come to consult the physician for ordinary lung tuberculosis.

A very unfortunate feature is that chronic tuberculosis generally makes its appearance in the form of what seems, to the layman, to be a most inconsequential, ordinary cold. It is the insidious disease *par excellence,* for as a rule it presents another equally treacherous characteristic, *viz.,* that of causing no pain.

Hence the widely held idea that a patient became consumptive as the result of a neglected cold. The true condition was not a neglected cold, but the stage of onset of chronic tuberculosis.

A picturesque old saying among certain laymen, which may appropriately be mentioned here, was that expectorating into the fire brought on consumption. This strange belief may be accounted for in the following way: The unfortunate patient who had contracted tuberculosis at the close of the summer season or in the fall huddled himself by the fire in winter and found it eminently convenient to expectorate into the ashes. When, in the following spring, the consumptive condition became plainly manifest, his friends came to believe that he had acquired the disease in the manner above referred to.

The so-called "cold," then, soon after to be known as a "neglected cold," constitutes the beginning of tuberculous disease. And from this time dates the usual sad story of the affection in the individual case.

The patient coughs more or less, and expectorates a little or not at all, but is in no wise perturbed by these symptoms—nor are his relatives. The trouble is held to be merely a cold, of which he will sooner or later be rid. The condition of such an incipient tuberculous subject, indeed, is apparently in no wise alarming; he comes and goes,

works, eats, drinks, and sleeps like any one else. Gradually, however, lassitude sets in, with slight loss of weight; the subject's appetite disappears and his relatives, becoming aware that the trouble is not an evanescent one at all, take him to a physician.

At the present time, some degree of change in this natural course of events has occurred, since it has become known that tuberculosis is not infrequently recovered from. But not many years ago the tragedy almost invariably ran its course, and too often, indeed, it still continues to run its course along the following lines: The tuberculous patient came to the physician's office escorted by one of his relatives. The medical man decided upon a diagnosis of tuberculosis, or failed to do so, according to the extent of the lesions. This diagnosis, however, or the suspicions of tuberculous disease that had been aroused in his mind, he kept carefully to himself. Why? Simply because he was imbued with that fatal conception that it was his plain duty to conceal from the patient the nature of the disorder. Sometimes he spoke of it to the patient's family but, for the same reason, let it be understood that the secret must be kept from the patient. He then wrote a prescription and sent the patient home with the consoling remark that he was suffering simply from a cold or a mild attack of bronchitis, which would pass off after a while. Weeks and months then elapsed, according to the type of the disease existing in the individual case, the patient's general resisting powers, and the more or less favorable hygienic conditions under which he lived. The so-called "tuberculous" patient at length became definitely a consumptive in the estimation of his relatives and friends. An eleventh hour resolution was then taken, the family decided upon the necessity of making a great sacrifice, and the unfortunate patient was given the

benefit of all available savings, only to die a few weeks later in some locality in a milder climate—the final delusion of the consumptive.

How fruitless this resolution! Already, nothing more could be done for the patient. No consumptive can have the lungs he has coughed out restored to him; new lungs cannot be substituted for those already riddled with tubercles.

At the present time, as I was saying, some degree of change has taken place in these matters. The majority of physicians, convinced that tuberculosis is curable, combat the family prejudices and insist that the patient be informed of his condition. This, indeed, is practically the only means available of forcing him to take proper care of himself while it is still time. Yet how often the parents are absolutely opposed to this course! How many times I have had presented to me by the patient a letter from the family begging me to conceal the nature of the illness from him! Evidently, the old, baneful prejudice is hard to eradicate. Sometimes, it must be confessed, the same request is made by the physician himself—a fact somewhat difficult to account for at this late date. It is absolutely the practitioner's duty, if any chances of recovery exist at all, to warn the patient that he is suffering from tuberculosis. If left in ignorance of it he will succumb in eight instances out of ten, while if warned in time, he will recover in the same proportion of instances provided his organic powers of resistance are adequate and his financial situation permits of his quitting his ordinary mode of life in order to undergo treatment. A high degree of guilt would, indeed, attach to well-to-do families which, for the sake of a mere old-fashioned sentimental notion, caused the patient to lose his only existing chance of successful treatment. For later it

will infallibly become necessary to admit to the patient that he is consumptive—and, for that matter, he will find it out himself, when it is too late. Furthermore, as long as the unfortunate victim drags along in his misery, and wherever he may chance to go, he will be disseminating the germs of tuberculosis. Not only will his lack of knowledge and heedlessness of the disease he is harboring have been the cause, as a rule, of his death, but before this final event he will have played a sinister rôle by infecting the premises in which his whole family has resided.

Finally, a still more unfortunate situation is sometimes encountered, *viz.*, that in which parents insist that their child is not tuberculous, because this cannot be so—because it is not possible. The physician who endeavors to apprise them of the unwelcome truth is badly mistaken, and is summarily dismissed. To make matters still worse, those in this state of mind fail to give proper care to the child because tuberculosis is to them a blot upon the family escutcheon.

## CHAPTER II.

### HOW TUBERCULOSIS IS ACQUIRED.

THAT tuberculosis is propagated as are plants, *viz.*, by a seed, is now considered well established. This seed is the tubercle bacillus. Estimations based upon microscopic studies having for their purpose to ascertain the activity with which this germ multiplies in the diseased lung tissue seem almost beyond belief. The micro-organism occurs in countless numbers in the least particle of tuberculous sputum. And unfortunately these bacilli, continuously expectorated by the billion, exhibit a most discouraging resistance to destructive agencies. Prompt annihilation of the germs necessitates the application of powerful chemical agents, the action of which could hardly be withstood by the body tissues themselves. Prolonged immersion in boiling water is required to kill them.

True, germ-laden dust exposed to the solar rays and even to diffuse daylight is rather rapidly freed of living tubercle bacilli, and physicians are daily emphasizing this fact in order to promote systematic, prompt, clean, and economical disinfection of all furnishings and other articles on the premises occupied by tuberculous patients. Sunlight, however, cannot by any means penetrate everywhere in dwellings, and innumerable lodging places for living, virulent tubercle bacilli remain even in what appear to be most carefully kept houses.

From this the dangers inherent in tubereulous sputum will readily be realized. Indeed, once dried and reduced to dust, the contained bacilli are disseminated everywhere—in the air and on all nearby objects. Under these conditions

they unquestionably remain viable long enough to make use of any opportunity offered to do damage.

While it seems to have been proved that their virulence becomes more and more attenuated when they are in admixture with dry dust, it is equally well established that these organisms reach their maximal virulence and potency for harm in dust resulting from the desiccation of fresh sputum. Fortunately, by means of certain rather simple hygienic precautions, or at least, precautions which can be instituted anywhere with a little care and energy, it is easy, as a rule, to forestall harm from the dissemination of fresh sputa. In the latter condition, indeed, the bacilli are kept from passing into the air. The precautions required in this connection will be discussed later on.

Since the number of tuberculous subjects is very large, and under ordinary conditions precautions for the destruction of sputum are almost never taken, the average human being, especially in the cities, lives constantly in an atmosphere more or less heavily laden with tubercle bacilli.

Fortunately, it has been almost conclusively established that in the usual form of tuberculosis the sputum constitutes practically the only route of elimination of the bacilli. The expired air, apart from that emitted during hard cough, does not contain any.

As for the sweat secretion, the question of tubercle bacillus elimination by this route is, perhaps, still open to discussion. Recently, observations of a somewhat experimental nature have shown that it is possible for the tubercle bacillus to be eliminated in the sweat of tuberculous subjects. But it has not been shown that such elimination is an ordinary occurrence, and until further notice, it will be well not to fall into an excessive dread of tuberculous patients who sweat. Reasonable precautions should, of course,

be taken in caring for them, but the chief aim should be to keep them from sweating.

The stools, indeed, often contain bacilli that the patient has swallowed. This, however, is attended with but relatively little danger, for not only is the fecal material less likely to find its way to contact with external objects, but it seems to have been proven that the fermentative processes occurring in privies are sufficiently powerful to destroy the bacilli.

Nevertheless the dangers from sputum are more than sufficient to excite marked apprehension.

Under these circumstances, the tubercle bacillus being everywhere about us, how are we to account for the fact that all persons do not develop tuberculosis? The answer to this query is that, in common with almost all parasites, the tubercle bacillus requires, in order to become implanted and, especially, to flourish in the human organism, a state which pathologists would term morbid receptivity on the part of this organism. For tuberculosis to become established necessitates not only the presence of the germ but even more essentially a prepared condition of the subject himself. The seed requires for its growth soil already prepared.

Robust individuals seem to live with impunity in the infected medium referred to; they take in the infectious agent, but at the same time measure up to the level of resisting power required successfully to combat its attacks. In a subject in perfect health and in good organic equilibrium, indeed, the tissues embody effective means of natural defence against the noxious activities of micro-organisms. It seems to have been demonstrated that certain of our constituent cells,—the ambulant, migratory cells,—form an army, as it were, of vigilant guards which, at a command

transmitted through the nervous system, or merely by virtue of the local congestion induced by the invasion of the parasite, travel in adequate numbers to the point attacked and in a short time engulf the assailants, which are soon completely annihilated. These cells, the phagocytes, wage a victorious combat against the parasitic bacteria through the process of phagocytosis.

The defensive measures taken by the organism against the germs are, however, probably not as simple as the foregoing explanation would appear to indicate. It seems to have been conclusively shown that the white blood cells, or migratory cells, capable of leaving and later returning into the capillary vessels by passing through their walls in the phenomenon known as *diapedesis,* roam about in the fluids in which the tissues are bathed, as though on a search for the microscopic parasites; that they surround and ingest these into their substance, immobilize them, and seem, at first sight, so to act upon them that they will be incapable of further harm if later set free. But it is by no means proven that the phagocytes actually kill the bacilli under these circumstances. The bacilli, protected by a cuticular layer which is extremely resistant to the dissolving and destructive action of the body fluids and various secretions, themselves secrete poisons, *endotoxins,* which, when liberated, are quite capable of killing the leucocyte that has ingested them, especially if this leucocyte has ingested, not one, but several bacilli. Thus, the leucocytes, while actually keeping the bacilli from doing harm to tissues, are themselves killed in the process. In this condition they are carried about in the blood and lymphatic circulations until they come—as very often happens—to an arresting barrier in the closely knit meshes of a lymphatic gland, where they remain

fixed for a long period, as though actually foreign bodies themselves.

An even worse alternative is also presented. These leucocytes, if not dead, at least sorely stricken, filled with bacilli and the toxins set free through their disintegration, may not become arrested and fixed in the manner just described. They may travel about anywhere in the vessels in all parts of the body and become arrested in some tissue or other, such as the lung, liver, spleen, brain, kidney, or skin, and there awaken an act of local defence—congestion, inflammation—intended to isolate the infectious foreign body. From this there results a nucleus of varying size the center of which, constituted of a bacillus-laden leucocyte, becomes mortified or necrotic, and involves, in addition, lethal changes in a definite zone of the inflammatory tissue newly developed about it—the whole sinister process being due to the poisons set free by the bacilli. In brief, there results a lesion of tuberculous nature, capable of persisting and of extending with the assistance of all of the common micro-organisms as well as through the agency of the tubercle bacillus itself.

This constitutes one of the most striking phenomena which follow the act of defence on the part of the tissues and the ingestion of tubercle bacilli by the leucocytes. But there occur also many other, more complex results which it will not be necessary here to discuss.

If the fight of the human organism for its life is to be effectual, this organism must be capable of maintaining the necessary army of vigorous defenders; it must be in a perfect nutritive equilibrium; its processes of assimilation and disassimilation must be on a solid footing.

From time immemorial attempts have been made to discover the precise cause of the condition of organic weak-

ness which, it is alleged, predisposes to phthisis. The strumous, scrofulous, or rachitic soil or *terrain* was always stressed in this connection, until at length it was noticed that this condition of the system is actually nothing more nor less than a disguised form of tuberculosis. On the other hand, emphasis has long been laid upon an antagonistic relationship existing between a certain type of constitution, inherited or acquired, known as *arthritism,* and tuberculosis or phthisis. Hence the therapeutic practice, which prevailed for two decades, of gorging the patients with meat products with the idea of thus rendering them refractory to the progression of tuberculous disease.

Later there arose the conception of a loss of mineral constituents from the tissues—*demineralization*—whence developed, or better, received a new lease of active life, the treatment by recalcification. This will be referred to again in a subsequent chapter.

More recently there has been put forth an interesting theory concerning diseases due to a lack of certain vitally important food materials (*carence*). This theory bears on the tuberculosis question, for according to some authors, many individuals suffer from a lack of certain nutritive principles which, while present in whole wheat bread, are wanting in white bread. These substances, belonging to the group of the *vitamines,* are contained more especially in the bran of the wheat grain and the outer coverings of other cereals. According to this, it would seem advisable for us, if our diet is to be a rational one, to revert to the whole wheat bread consumed by our ancestors and still at the present time by the peasants in certain countries.

Finally, the thought arose that the nutritional disturbances among the tuberculous, and in particular the loss of mineral substances, might, at least in part, be dependent

upon the so-called endocrine glands, especially the suprarenals, which, as a direct result of the tuberculous intoxication, might easily be rendered incapable of fulfilling their normal functions. Hence the recommendation by certain of our foremost tuberculosis specialists to administer systematically *adrenalin*, the active principle of the adrenal secretion.

Let the body, for some reason or another, become weakened; let the normal equilibrium be lost; in a word, let the system pass into a state of inadequacy of the organic functions, and at once the natural means of defence begin to fail, and the body becomes an easy prey to harmful external influences. An individual who, previously in a robust condition, dwelt with impunity in a focus of infection, has every chance of becoming tuberculous if, at some time or other, he loses his powers of organic resistance.

The proof of this is that although many persons in complete health harbor in their nasal cavities and throat large numbers of highly pathogenic germs, including both those of tuberculosis and of pneumonia, few actually serve as culture mediums for these micro-organisms. The bacteria, nonetheless, are constantly there, awaiting a chance to enter and watching for the opportune moment to become successfully implanted.

The causes of these general or local failures of resistance which render man an easy prey to the tubercle bacillus are many. Tuberculosis is the most powerful of all agencies in pathological selection. It constitutes a fatal crossroads, to which avenues of access lead from all sides.

In the first place there may occur a state of congenital inferiority which results in the production of delicate, puny, atrophic individuals, practic ll destined to develop tuberculosis. To be su

brought up under excellent hygienic conditions, may resist the disease. But how many of them fall by the wayside during childhood or adolescence!

The disease attacks young subjects particularly during the growing period, whether they have already from the start been candidates for tuberculosis owing to their original state of organic depreciation or have appeared to enjoy satisfactory health up to the time of onset. All influences combine to render them vulnerable during this period. They are undergoing continuous growth, and woe unto those that are not sustained with ample nutriment, adequate in amount to allow of due physical development, in girth as well as in stature! Again, during this period many children are overtaxed both physically and mentally in their studies, often conducted under imperfect conditions of hygiene and diet. They begin to complain of headaches, exhibit a slight evening rise in temperature, and become subject to a host of disorders generally ascribed to "growing fever;" growth is, indeed, taking place, but in nine cases out of ten tuberculosis has already appeared on the scene.

This is the stage of life during which youths are exposed to the wearing influence of excessive study and overstrenuous sports. In the latter connection, many pride themselves on keeping their weight down, like professionals. Style and form being prized above all else, no sensible thought is given to these matters until certain warning signs begin to appear. Happy are the families possessing their own family physician, with knowledge of the histories and proclivities of the various members, who keeps watch over the growing children and is at hand to give warning to the father and mother, unaware as they are that tuberculosis is constantly lying in wait for their offspring.

Likewise in adolescents, chronic disorders of the upper respiratory passages, nasal obstruction, recurring sore throat and tonsillitis are potent factors in the induction of tuberculosis, owing to the hindrance to breathing they entail. These adenoid children, as they may be called, suffer constantly from nasal obstruction and are compelled to keep their mouths open both day and night. The nose being intended for respiration and the mouth for taking food, the mouth and the throat, into which it leads, are thus deprived of the protection of their normal defender, the nasal fossæ; chronic inflammation sets in in these structures, bacteria pullulate freely, and the lung tissues may at any moment become secondarily involved. When to this is added the mechanical obstacle to thoracic expansion offered by the nasal obstruction, it is easily seen why such children should be predisposed to chest disorders.

Not a few of these chronic affections of the nasal fossæ and throat are, moreover, themselves of tuberculous nature, as many investigations have shown.

Where compulsory military service obtains, the subject is next exposed to life in the barracks, with their admittedly poor hygienic status both by day and night, except, perhaps, during the summer season. Many young men, fortunately, find themselves improving considerably in health as a result of the training to which they are subjected during military life. But one should not conclude that perfect health is uniformly prevalent under these conditions.

Indeed, there are a great many who, while apparently in a sufficiently satisfactory state of health at the time of enrollment, lose their powers of organic resistance within a very short time and pass into an actively tuberculous condition. These are, of course, nearly always subjects in whom the seeds of the disease had been implanted long before,

but nonetheless it is the military service which proves their undoing. Many could have lived to a ripe age in the fields, carrying on their work according to daily needs, as do rural inhabitants in general.

Among the gentler sex, circumstances are again different. There is, in the first place, the formative period, so often stormy and even critical, to which a special disease, *chlorosis*, had come to be almost exclusively assigned. In all likelihood chlorotic anemia, with its peculiar pallor, may be due to a variety of causes. But it seems now to have been established, in a general way, that the chlorosis of puberty is simply an outward manifestation of overlooked tuberculosis. Very frequently of a mild type, the disorder due to tubercle bacillus infection ends in recovery, because the young girl, who receives much attention and is the object of much solicitude at that period, is kept under watch by the physician and is constantly under care.

Yet how many young girls become tuberculous at that critical time! And how many, too, able to throw off the disturbance, apparently for a while, recover only to relapse a little later, particularly after marriage.

From the practical standpoint it should be made a rule —through excessive prudence, perhaps—to consider any girl who is chlorotic at puberty at least a likely subject for tuberculosis. When closely observed, it will be noticed that she often has a dry cough; that sometimes she brings up a little blood-streaked sputum at her supposed menstrual period; that at the same time the thermometer, placed in the mouth or axilla during the afternoon, shows an excess temperature of a few tenths of a degree centigrade; that she experiences discomfort in one or both shoulders; that by pressure with the finger a certain amount of tenderness can be elicited over a definite point of the lung apex; that

one or two small lymphatic nodes have appeared in her supraclavicular spaces. Less than this, indeed, is sufficient to make a careful and repeated lung examination imperative. Upon painstaking inquiry the area at fault will often be located at the exact point where pressure with the finger had elicited tenderness.

During this period, furthermore, the physician is frequently consulted on account of the so-called *intercostal neuralgia* of young girls, unfortunately considered a harmless symptom. This form of neuralgia, which generally extends from the fourth rib at the spine to the sixth rib in the axillary line or to the sternal junction of the fourth rib anteriorly, is in the majority of instances simply an outward manifestation of a small tuberculous focus at the root of the interlobe. Oftentimes, too, it is due to the presence of diseased lymphatic ganglia about the bifurcation of the bronchi; frequently these ganglia give rise to pain before the menstrual periods.

In general, any chlorosis or anemia at puberty should be held distinctly suspicious. If the young girl recovers from the disturbance, so much the better. But subsequently, up to the time of her marriage, and especially *at* the time of marriage, the question of tuberculosis should always be put down as something which may later give serious concern.

At this stage in the life of young girls arises also the really significant question of feminine dress. Whether through emulation of others or from maternal instruction, the steel corset comes to the fore as one of the appurtenances of charm and elegant carriage. If unhappily the tightly enclosed body makes known its complaint, the garment closes less readily than usual, or the figure departs in some degree from the prevailing style of lissomeness or actual emaciation, an unseemly gain in weight appears to the

maiden an accomplished, unwelcome fact, and at once the diet is reduced to overcome the difficulty.

And the worst of it is that the young lady's mother and aunt, fortunately of such build that they were able to stay thin up to the age of 28 without becoming ill, are the first to deny that their children are not at least as fashionably formed as they themselves had been.

Once the maiden is imbued with this notion of the indispensability of a slender figure, it is there to stay, and he who succeeds in inducing her to abandon it is to be congratulated. Further, bodily development and puberty occur, stature and weakness alike increase, but no more food is taken than before, and tuberculosis, certain of its victim, sets in insidiously in its own good time.

Even when already ill, the young girl will sometimes not give in. The physician may talk to her earnestly and even harshly on the subject; the mother, finally convinced, will assist him in his efforts, but even then, too often without result.

In quite a number of well-to-do families there seems to be a family tradition not to eat much. This sort of thing may be indulged in for a time; but all the succeeding generations are not alike. Later there may issue more delicate children who require energetic, well-directed care if they are to live. By reason of the family habit of not eating enough, these children are quickly undermined while in process of development. Extreme surprise is then expressed that consumption should have found it possible to enter into a family the members of which have always lived to be 80 years old.

Fortunate are the families, I repeat, who are wise enough to have, as in former times, a family physician who knows all about the health of each person, can detect

deterioration and unwarranted departure from the normal state, and set things right before it is too late.

Undermining a subject who should theoretically live there are various causes of general impairment, including all the acute or chronic diseases, long since recognized as conditions predisposing more or less effectually to tuberculosis. All excesses, all physical or mental wear and tear, all forms of overwork, all that is capable of continuously interfering with organic balance—all such influences place the human subject in a state of relative debility and reduce his natural means of defence against tuberculosis. Badly ventilated dwellings, overcrowding, insufficient food, staying up late at night, repeated pregnancies, etc., are all powerful factors in bringing on consumption.

Pure air has from time immemorial been empirically considered the best curative agent in tuberculosis. More recent series of experiments have afforded ample demonstration of the fact that confined, pestiferous, miasmatic air augments the vitality and virulence of germs in general, such properties being, on the contrary, attenuated or even annulled in pure air.

Continued nervous stress is, in the case of tuberculosis just as in typhoid fever, a predisposing cause of the first order. It is not unusual to see strong men, apparently free of any physical defect and not subjected to physical overwork, fall victims to phthisis as a sequel to violent grief, even while outwardly preserving all the appearances of good health. The result is the same whether the subject has been overtaxed physically, mentally, or emotionally.

Since excesses and overwork are only relative quantities, depending to a marked extent upon the individual himself, it is not permissible to dispute the above propositions on the ground that a given individual, who has been over-

taxed all his life, has committed excesses, and, to use a popular expression, been perennially "celebrating," has never contracted tuberculosis. Of course, a few instances of this sort are met with. But how many, living under such conditions, are carried off by some epidemic disease! Moreover, tuberculosis is not the only pernicious influence operating selectively in these cases. In many robust men who become addicted to alcohol and allied toxics, pathological change due to alcohol is the initial step in physical deterioration, and tuberculosis is then superadded and seals the victim's fate. Tuberculosis is the great gateway to death among alcoholics.

The majority of acute diseases, furthermore, predispose to tuberculosis owing to the impairment of bodily vigor they induce; but the ones most active in establishing such a predisposition are those the symptomatology of which includes pulmonary involvement. Hence the well justified sinister reputation of various inflammations of the pleura and lungs, of measles, of typhoid fever, and especially of influenza. Ever since influenza, in its essence an epidemic disease occurring at long intervals, has become implanted in our midst as an almost permanent factor, this disorder has been found present at the start of a large number of cases of tuberculosis.

Again, how often, with "grip" supposed to be an all-pervading, common disorder throughout one-half of each year, cases of actual tuberculosis are labelled "grip." The laity are always pleased to have at their disposal some ready-made term which they can apply, when the occasion presents, to any slight illness, cold, pulmonary or pleural congestion, or even pneumonia or pleurisy. How easy it is, among undetected ambulant cases of tuberculosis, to discover an attack of grip two or three times during a winter!

Too often these illnesses are actually acute attacks of tuberculosis, as shown by the subsequent course of events or the physician's diagnosis, if he is consulted.

Similar considerations apply in *pleurisy,* whether dry or accompanied by effusion. Often patients are heard explaining that the cause of their illness is a pleurisy, or that they have formerly been under treatment for dry pleurisy at the apex of one lung. In this connection, however, a certain distinction must be made.

Pleural inflammation may be due to one of various causes, even aside from the formerly recognized simple pleurisy *a frigore.* Probably any lesion of the pleura, of whatever cause, may be a factor predisposing to tuberculosis. But it seems now to have been demonstrated that nearly all instances of pleurisy, whether dry or with effusion, if unassociated with any palpable cause in neighboring tissues, are of tuberculous nature. Pleural inflammation not plainly accounted for is thus almost certainly a manifestation of invasion by the tubercle bacillus. These unlabelled pleurisies are in the great majority of cases an accompaniment of tuberculosis. And the chances of tuberculosis are even greater if the condition is located at the apexes of the lungs; under these circumstances, indeed, they are practically equivalent to a certainty.

When patients report having had an attack of pleurisy some time before the onset of definite tuberculosis, this means simply that their present tuberculous illness is not the first one they have been through. The truth of the matter, which cannot be repeated too often, is that in the majority of instances these minor premonitory attacks, these forewarnings of consumption, pass off completely either spontaneously or under treatment. No label was affixed to the disorder, and the patient, as soon as he got to

feeling better, returned to his ordinary mode of life in complete ignorance of the fact that he had just been going through his first experience with tuberculosis.

All that has just been mentioned as regards pleurisy, especially at the apexes of the lungs, applies also to the minor disturbances often met with and labelled "congestion of the lungs," likewise at the apexes. These are again invasions by the tubercle bacillus and warnings of phthisis. If, by some fortunate chance, these apparently insignificant attacks of bronchitis in the upper portions of the lungs are accompanied by blood spitting, the warning is not lost. To be congratulated are those whose onset in tuberculosis is marked by hemoptysis, even if rather severe. Such an event constitutes a beneficent warning which opens the eyes of the patient's family. For in nine cases out of ten blood-spitting in a young subject means tuberculosis. Where it does not occur, the so-called "congestion" is recovered from without any recognition of its true nature, and too often, after a variable period of time, frank tuberculosis sets in with more or less alarming symptoms.

Tuberculosis of the lungs, to which reference is herein exclusively made, apparently becomes *implanted* by introduction of the tubercle bacillus through the respiratory passages. It is quite probable that many times the bacilli pass into the lungs of a healthy individual without being able to effect a successful implantation. If, however, the soil has already been prepared for them, the bacterial seed takes root.

It seems bootless to propound to ourselves the question whether an actual lesion or solution of continuity in the lung tissue is necessary to afford entrance to the germ. In nine instances out of ten, indeed, tuberculosis begins at the apexes, and likewise, in nine instances out of ten, lesions

the result of some form of ordinary bronchitis, which one might be tempted to emphasize as favoring implantation, are situated, instead, in the lower and intermediate portions of the lungs. For this reason it is generally believed that the lung apexes, less active in respiration and perhaps receiving a less bountiful blood supply than other parts of these organs, constitute a *locus minoris resistentiæ.* Numerous theories have been advanced to account for this predisposition of the pulmonary apexes to tubercle implantation, and for the time being it will perhaps be best to limit ourselves to the conception that, on the one hand, these portions of the lungs are hampered in their expansion by the relatively fixed upper two ribs, and that, on the other hand, arterial circulation is perhaps less active there, while the venous blood in its turn fails to remain there for the usual period, whence a constant state of relative anemia prevails.

Ever since the communicability of lung tuberculosis has been generally recognized, it has been an important question whether transmission takes place through the respiratory passages or the alimentary tract, or whether it may occur through both.

As some cases of tuberculosis *appear* to start in the digestive tract or related structures, attention has always been directed to food as a possible vehicle of the tubercle bacillus. Whence, campaigns for proper hygienic precautions, duly directed against milk from tuberculous cows and against meats from diseased animals, and dealing also with other alimentary sources of infection, including both the articles of food themselves and the eating utensils.

Because, however, the majority of cases of tuberculosis *appear* to start in the lungs, the thought directly arose that inspired dust must be the chief factor in transmission.

In recent years, important experimental investigations have been conducted in an attempt to overthrow the above mentioned propositions. They have seemed to indicate that infection through the alimentary tract is the more frequent or even the sole means of implantation of the tubercle bacillus. After extensive discussions and no less memorable counter-experiments, the problem seems to have remained in *statu quo,* each observer retaining his own view of the subject on the basis of clinical observation or of experimentation.

On the whole, it is still advisable, until further light is shed on the question, to accept the view that in the presence of the predisposing conditions above referred to infection may occur either through the digestive tract or through the respiratory passages. If I am not mistaken, however, the present tendency on the part of clinicians is to recognize respiratory infection and to regard infection through the digestive tract as exceptional.

These problems of infection in a tuberculous environment or under ordinary conditions of life are of enormous importance. For if the data garnered through experimentation on animals are analyzed to their ultimate conclusion, the inevitable result reached will be to propose highly burdensome hygienic regulations and cast dismay among lay families, which, by further exaggeration, will come to consider as a plague-stricken individual any one of their members who is so unfortunate as to contract tuberculosis. As a matter of fact, the course of conduct really in order is to care for the patient sedulously and without fear, provided certain simple precautions are taken.

In any event, it is a fact of the utmost significance that tuberculosis nearly always strikes at the apexes of the lungs.

The question as to whether the bacilli reach there exclusively by way of the bronchi, or, coming from the tonsils or intestine, may be carried there by the blood is, after all, one unrelated to current practical needs.

Appropriate mention may here be made of the formerly widely accepted view of cases of consumption resulting from *exposure to cold* or from *direct injury* to the chest.

Even at the present time one still hears it commonly stated by patients that their lung disturbance began immediately after getting chilled, or after getting overheated and then being exposed to cold.

Before the bacterial origin of tuberculosis was known, the actual sequence of events seemed to favor this view. After successive exposure to heat and cold the subject was seized with pulmonary congestion, bronchopneumonia, or pleurisy which, in turn, passed more or less rapidly into tuberculosis. Such an explanation of the cause seemed sufficient. At the present time, however, the clinical results are accounted for in an entirely different manner. Without absolute denial of the possibility that under the influence of cold the tubercle bacillus already harbored in the nose or throat may suddenly implant itself in the lung—as occurs in the case of the germ of acute pneumonia—the sequence of events is rather conceived of as follows: The person who, after exposure to cold, developed a pulmonary congestion at one apex, or a pleurisy, or a bronchopneumonia soon to be announced as of tuberculous nature, was already a carrier of tubercle bacilli in the apex. Primary localization of tuberculosis in the lung had already taken place, but without any one being aware of it. Exposure, like pronounced fatigue, overwork, or heat prostration, simply whipped up to activity the previously latent tuberculous process.

The same sequence very probably applies in regard to traumatic tuberculosis. A subject apparently in a more or less perfect state of health receives a sharp blow upon some part of the chest. He experiences pain for a time, and little by little, either in a latent progressive manner, or more suddenly, signs of tuberculosis appear at the corresponding point in the lung.

Here again it is not absolutely denied that the injury to the chest wall, the pleura, and the subjacent lung tissue may have favored implantation of the tubercle bacillus which has travelled down from the nasal cavities or pharynx, but the tendency is rather to hold that this traumatic tuberculosis represents a secondary localization of a process already existing in the apexes of the lungs and which had escaped notice until the time of injury.

All the preceding remarks, of course, refer to the cases where tuberculosis *a frigore* or following traumatism develops in individuals apparently in more or less perfect health. Particularly as regards traumatic tuberculosis, the possibility is to be considered of its developing in subjects already suffering from tuberculosis of bones or of other organs apart from the lung. This brings up again the question of distribution of the bacilli by way of the blood circulation.

The reader should not conceive the idea that before Koch's discovery nothing was known of the foregoing circumstances. Tuberculosis was perfectly well known to be a disease allied to bodily deterioration and waste of tissues and greatly favored by impoverished physiological conditions and various morbid states. Nothing has been changed in this connection since his discovery, but at least now we are acquainted with the enemy to be combated, and realize

that a fight must be waged when this enemy has started to attack.

Not a word has as yet been said regarding *tuberculous heredity*. And yet, up to the time when Villemin was able to demonstrate the transmissibility of tuberculosis, the causes of the disease were summed up practically in the statement that tuberculosis is a hereditary disorder. According to the Hippocratic dictum, every phthisic is born of a phthisic. Such was the fatal sentence. Heredity could be traced in every case in some way or other—which is not to be wondered at in view of the large number of tuberculous cases.

True, it seems to have been established that the tubercle bacillus may be congenitally harbored in the newborn child, but instances of this kind are so rare that they need hardly be taken into account. What is generally inherited from tuberculous parents is a weak constitution, an organic soil favorable to the development of germs. This leads back to the domain of general etiology, already discussed. Thus, tuberculosis in the parents has the same effect on the offspring as could have been exerted by any other cachectic state from which they might have been suffering during the period of child bearing.

For some time, however, a number of authors, adherents of the theory of actual bacterial heredity, have been calling attention to the following explanation: Many subjects destined to become tuberculous not only possess at birth an inherited soil which is favorable to the growth of the tubercle bacillus, but also harbor the bacterial seed itself in some one of their organs. This seed may never germinate. Nevertheless, it is this seed which, at some period or other in the subject's life, will initiate the bacillary manifestations, varying in nature and localization, which these

young subjects may exhibit for years and which finally lead to pulmonary tuberculosis.

According to this view, tuberculosis of childhood or adolescence is due to more or less delayed activity of a bacillary infection latent since birth. Such is the theory of inherited tuberculosis—which, after all, does not by any means invalidate the theory of tuberculosis transmissibility.

The important fact to be retained from the foregoing discussion is that tuberculosis sets in because, whether as a child, adult, or aged person, the subject has fallen into a condition of organic debility which renders his body a fit soil for the development of the tubercle bacillus, constantly about him or even within him, as some claim. This condition of debility may have either accompanied him into the world, have followed some undermining disease, or have been the result of a general depreciation in his physiological functions due to some external or internal cause.

## CHAPTER III.

### CONGENITAL IMMUNITY AGAINST TUBERCULOSIS.

THE problem of tuberculous heredity has long concerned itself with two fundamental propositions, *viz.*, inheritance of the bacterial seed of the disease and inheritance of a favorable soil.

At the time when it seemed to have been finally demonstrated that instances of transmission of the tubercle bacillus from the mother to the fetus are so exceptional that they may, for practical purposes, be left out of account, attention was directed all the more forcibly to the conception of heredity of the soil, *i.e.*, an inherited predisposition to tuberculosis. None of the arguments brought forth in support of it have lost any of their cogency, and since the earliest historical ages, the persons likely to develop tuberculosis have been constantly observed, pointed out, and described in detail.

From the scientific standpoint, however, our conceptions of the disease have undergone elaboration, as with many other distinctly infectious disorders, and in late years the question as a whole has been further complicated by the newer view of *congenital immunity* to tuberculosis, which may be summarized as follows:

The vast majority of cases of tuberculosis exhibit direct tuberculous heredity from the father, the mother, or both parents. When a prolonged statistical investigation of the subject, such as I have been conducting for years, is made, one is easily able to show that such is the case in from 60 to 70 per cent. of the tuberculous patients who

come under the physician's care. A good idea is thus afforded of the actual percentage that would be obtained were all factors in the inquiry immediately at hand. Confirmation of the ancient Hippocratic dictum previously referred to is thus obtained.

On the other hand, clinical observation and laboratory procedures seem definitely to show that, among civilized populations, 95 to 98 per cent. of all children are tainted with tubercle bacillosis from early infancy: one might about as well say that they are *all* so tainted.

Here we have two features which hardly agree—on the one hand, the proposition that the bacterial seed is not inherited and on the other, the fact that practically all children are tainted with tuberculosis. To make them compatible, one would have to conceive that the child, free of tubercle bacilli at birth, becomes infected with them either at once or soon after owing to the fact that he is placed in an environment highly charged with bacilli, *viz.*, the atmospheric air infected by all the bacillus carriers in our civilized countries, particularly in the cities.

In this connection, differences of opinion arise as regards the exact time of life at which the child becomes infected. Does he become infected at birth through the very fact of being immersed in an infected medium? And granting this to be the case, is this early infection acquired mainly through the respiratory passages? Or is it acquired only later when, coming into closer relationship with the outside world and being no longer fed exclusively on maternal milk, he begins to make use of his hands to touch every thing about him and bring in contact with his mouth and nasal cavities all objects within his reach? Again, is this later infection acquired mainly through the alimentary tract? While awaiting further evidence on the subject one

may choose at will one or the other of these hypotheses. Those eclectically inclined will assert simply that bacillary contamination must take place within the first few months of life, and that it occurs sometimes through the respiratory tract and at others through the alimentary canal.

At all events, under such circumstances, and taking into account all that is known concerning the major microbic, infectious diseases, one is led to wonder how it is that all or nearly all children are not overwhelmed and killed at the start by tubercle bacillus infection in its hyperacute, hypertoxic, and extremely severe forms, after the manner which prevails, or rather, formerly prevailed, when European travellers carried tuberculosis to "native" populations that had never had any contact with the disease, or when an individual from one of these countries was taken and transplanted among an infected European population.

The explanation is simple, or at least apparently so. Among races that have lived for long periods under civilized conditions, the human system no longer constitutes virgin soil in relation to tuberculous infection. For centuries, an ancestral immunity against tuberculosis has been establishing itself through successive passages from generation to generation. Every newborn individual receives the benefit of this, though to a varying extent. Our forebears were not all killed from the start by generalized infectious bacillosis; they waged a winning battle against it, emerged as victors in the face of successive attacks of localized acute bacillosis as well as of chronic bacillosis, and in doing so acquired an immunity which they have transmitted to us. It is because of this congenital immunity that we do not succumb to the first attacks of the infectious medium we enter at birth.

Thus, it is not tuberculosis that our tuberculous parents transmit to us, but rather the immunity against tuberculosis which they have probably inherited themselves, or perhaps acquired and further enhanced through their own contact with the infection.

It is of interest to note, in support of the statements just made, that when compared with the dwellers in large cities, the inhabitants of remote, isolated and but slightly frequented country districts often behave like the "virgin" members of so-called savage races, *i.e.,* when they leave their fields to live in populous cities they show a special susceptibility to destruction by acute bacillosis—in all likelihood because their ancestral immunity is practically ***nil.***

If this immunity were always complete, no further attention would have to be paid to the social problem of tuberculosis, at least for a certain period of time. But unfortunately, such is not the case. Some individuals are satisfactorily immunized, others are only indifferently immunized, and still others possess but slight immunity, or even none at all—if such an expression is permissible. From this circumstance alone one may predict what their respective chances will be in our high-tension, bacillus-laden environment.

In explanation of these variations in the intensity of congenital immunity it may be supposed that they bear a relationship to the systemic efficiency or standard of health of the parents at the time of procreation, whether this health standard finds expression in their tuberculous taint, their condition of debility or overwork, taints other than tuberculous which need not here be enumerated, temporary intoxications such as acute alcoholism, an acute illness, etc. Accordingly, tuberculous parents may procreate offspring in a high state of immunity provided they are themselves in a

state of robust health, *i.e.*, in possession of good immunity, at the time of procreation.

In consequence of all this, it might be maintained that the children spoken of as being predisposed to tuberculosis are not thus predisposed merely through tuberculous inheritance. On the contrary, at birth they have been endowed with a more or less pronounced degree of immunity. They are predisposed to tuberculosis just as they are predisposed to all other diseases the infectious agents of which are going to attack them as soon as they enter our external environment. They are congenitally weak subjects, who may at any time succumb to tuberculosis as well as to any other disease, but rather to tuberculosis than the others because tuberculosis is the foremost agency of pathological selection. All these trials for them result from the fact that their parents, at the time of procreation, had acute or chronic disorders which almost or entirely annulled the hereditary immunity which they should have transmitted to their offspring.

These various children with tuberculous heredity, upon passing into our bacillus-laden medium, offer more or less resistance, or none at all, to the onslaught of the tubercle bacillus, according to their standard of congenital immunity. Some are almost born dead, incapable of living, succumbing to anything or to nothing at all; others are killed by one of the diseases of early life—perhaps tuberculosis; others pass through a non-lethal tuberculous attack, termed by some "typho-bacillosis," a condition apparently bearing the same relationship to hyperacute fatal tuberculosis as varioloid does to smallpox; others go through all imaginable forms of tuberculosis—acute, subacute, chronic,—and emerge victorious in greater or less degree, apparently acquiring additional immunity with each successive combat

and reinforcing their inherited immunity; others appear to have fought off the disease with complete success and to have become thoroughly protected against further attacks; others, finally, wage incessant warfare against the disease until they reach an advanced age.

The above conceptions afford a satisfactory explanation of the time-honored assertion that tuberculosis is a disease characterized by successive stages and the onset of which dates back to early childhood.

So far, this is but a theory; but it seems a satisfying one, for it is in complete accord with our knowledge of infectious diseases in general. It clashes in no wise with the principle of the transmissibility of tuberculosis, since it implies inevitable inoculation of all children in the bacillus-laden medium; again, it is in no wise opposed to the view of a subsequent tuberculous reinoculation in subjects who for various reasons have lost their immunity.

Prolonged experience, extending over thirty years, has convinced me that a subject in a state of active tuberculosis does not take up the tubercle bacilli of other individuals—or, if it seems preferable thus to state it, that the bacilli of other individuals have no hold upon him—and that, furthermore, as long as he remains in a state of active tuberculosis, he carries within him the causal agent of all untoward events, all disturbances and all complications that he may experience. I have never observed anything which would tend to refute this assertion.

On the other hand, I am in no wise disposed to dispute the statement that a tuberculous subject long since recovered from his attack or attacks, thoroughly healed and proven free of the disease by observation for years, may contract the infection afresh. Such an event brings one back again to the ordinary mode of acquisition of tuberculosis.

This problem of reinfection, and in particular the phenomenon of massive reinfection in laboratory experiments on animals, have led to a number of highly interesting investigations, discussion of which here would, however, lead us too far afield. Suffice it to state such reinfection appears best to account for the rather common instances of strongly constituted persons, free of any apparent tuberculous history, who develop tuberculosis in a rather rapid fashion after having cared for and been in close contact for a considerable period of time with a consumptive expectorating copiously, under poor sanitary conditions and, in particular, in a closely confined atmosphere.

# CHAPTER IV.

## THE CLINICAL COURSE OF PULMONARY TUBERCULOSIS.

I. UNTIL relatively recent years, it had always been believed that tuberculosis became implanted almost exclusively at the apexes of the lungs.

A discordant note was, however, sounded by certain excellent observers, specialists in pediatrics, who found that in early childhood the initial focus of the disease is by preference situated in the central portions of the lower lobes of the lungs and is accompanied by enlargement of the lymphatic ganglia which surround the roots of the bronchi. Manifestly, in such instances it is, as a rule, impossible to detect these deep foci with our ordinary procedures of investigation—apart from the x-ray—as they are separated from the observer's ear by too great a thickness of normal or relatively normal lung tissue, which is a poor sound conductor. As a rule, they come to light only as autopsy findings. But since, on the basis of these observations in small children the authors referred to justifiably consider the disease at the base of the lung to be the initial lesion or primary chancre of inoculation, it seems no less justifiable to conclude that the apical lesions already constitute secondary manifestations of the disease.

This, of course, does not detract from the fact that *clinically, the disease process at the apexes is the first to become perceptible to examination and consequently remains the first outward manifestation of lung tuberculosis* whether in the adult or the child.

II. The tubercle bacillus, whether it reaches the lung through the respiratory passages or by way of the circula-

tory tree, gains a foothold at approximately the finest ramifications of the bronchi, usually in the pulmonary lobules that immediately underlie the enveloping pleura. There it gives rise, through a local inflammatory process which has been held to be a defensive measure on the part of the tissues, intended to segregate the bacillus and destroy it, to small nodules of fibrous appearance, which constitute the tuberculous granulations or tubercles. More or less copious production of these takes place, the surface involved is more or less extensive, and the tubercles are found more or less discrete or confluent. The pleura promptly becomes inflamed owing to their presence, becomes thickened, and contributes to the formation of the pleuropulmonary foci at the apexes; beneath the pleura, the bacillus has begun to attack the lung lobules at a greater depth, these foci thus acquiring greater thickness.

Such is the primary tuberculous process at the apexes in its incipiency. As a general rule, both lungs are invaded in like manner and at the same time, though to a varying extent; but in a majority of instances one side seems more seriously involved than the other, and if the disease is not checked during this period, one of the apexes shows continuous development of the morbid process, while in the other the process stops, as though the nodular tuberculosis there had become dormant.

Already at this time, small lymphatic glands in the supraclavicular space, at the base of the neck, exhibit neighborhood reaction, enlarge, grow harder, and become palpable like leaden shot or peas rolling beneath the skin; likewise, the muscles overlying the apexes of the lungs become atrophied and give rise in this region to an emaciated condition which is both visible and palpable.

III. Alarming symptoms seldom appear during this period of implantation. Slight loss of weight and of general strength, with slight febrile excitation in the evening, are the manifestations to be expected, and are usually ascribed to fatigue, overwork, growth disturbances, etc.

This condition at the apexes, indeed, seldom brings on cough, or causes so little cough that no attention is paid to it; there is practically no pain, and unless the physician painstakingly and purposefully examines for it, it escapes notice.

The condition may persist for a long time—for months; it may even be spontaneously recovered from, without having been detected. On the other hand, it may exhibit progression in one of various ways.

Often the disease extends little by little, from one bit of tissue to the next, invading both the surface and the depths of the upper lobe of the lung. The tuberculous nodules become confluent, coalesce into larger foci which undergo softening in their centers, and form minute, microscopic cavities which pour their mucopurulent secretions into the neighboring bronchi.

Then the patient begins to cough and expectorate more or less—unless, as is very frequently the case, he swallows his sputum. Fever sets in in the evenings; the patient is disturbed at night, being awakened by sweats; diminution of body weight continues, and the appetite is lost.

Plainly, at this stage the patient with lung tuberculosis is known as an ill person to all. A blind man alone could fail to detect the disease, even without ausculting the patient. For in young subjects there is practically no occasion save tuberculosis for cough, expectoration, loss of weight, fever and sweats, unless it be a severe cold of a week's duration.

Under these conditions, suppuration having become established, even if it be as yet very slight, the patient is henceforth exposed to any of the most severe complications of tuberculosis, as we shall presently see.

But even at an earlier date, in the dry period of simple implantation at the apexes, expectoration of blood may occur. After some fatiguing exertion, a long walk, or merely after standing for a time in the sun, after exertion of the upper extremities, a game of tennis, or socker, or even after an unduly heavy meal, the subject is seized with dry cough—or, without coughing, may experience a tickling sensation in the throat—and brings up some bright red blood. Whether much or little blood appears, the condition is the same. The alarm has been sounded, and the entire family is given a fright.

The symptom, as a matter of fact, is generally not attended with actual danger, and subsides just as easily as it appeared.

Fortunate, we have already said, are those whose tuberculous disease is disclosed from the start by hemoptysis. Such patients have had due warning, and have merely to take proper heed.

Another, somewhat more serious form of blood expectoration, met with during either of the stages above referred to, is that attending an attack of hemorrhagic congestion. Following one of the exciting causes already enumerated, the victim is suddenly seized with fever and congestion of the lungs, and on the next day or the succeeding days develops hemoptysis one or more times. Even this emergency likewise passes off, but after the fever has subsided one of the pulmonary apexes remains impaired for a more or less prolonged period. Here again tuberculosis has announced its presence in a sudden, forceful manner.

The remaining occurrence most frequently observed during these two stages is pleurisy. This is generally recovered from, however, and thereafter matters may take either one of two different turns. Either the apical lesions pass unnoticed and the patient is treated for pleurisy ascribed to exposure, or, during convalescence, the apical lesion gives more distinct evidence of its presence, and then, too often, tuberculosis is said to have been *brought on* by the pleurisy.

As a matter of fact, all of the above mentioned disturbances constitute merely secondary manifestations of a preexisting tuberculous infection.

Up to this time, whether hemorrhagic and pleural complications have or have not occurred, the pulmonary tuberculosis has, in fact, been only in its primary stage, that of scattered or coalescent nodular lesions in the apexes. In this stage the disease is still relatively mild. If the patient is sufficiently strong constitutionally to keep up the fight, *he will recover in the great majority of cases if he is properly taken care of, i.e.,* if a radical change is made in his mode of living and he is subjected to a course of systematic treatment, more or less strict according to individual conditions.

IV. If, however, the subject fails to heed the warnings received, if he refuses to stop, if he continues to subject himself to the stress of active workaday life, he runs great risk of developing the really grave manifestation of tuberculosis, *viz.,* the so-called "pneumonic attack," which in all its forms, mild or severe, seems to be caused by a tuberculous bronchial plug or embolus. Some fine day, out of clear sky, after some form of physical excess, a heat stroke, or even a chill from exposure, the patient, thus placed in a weakened position predisposing to an unfavorable turn of

the disease, dislodges a softened nodule from the lung apex and, forcing it into the bronchi, transfers it to a more or less remote portion of the lung.

The associated illness is generally severe. The patient goes to bed with a sharp pain in the side and, with or without expectorating blood, passes through an attack similar to pneumonia. It actually is a pneumonia, but one of a tuberculous variety. Its gravity lies in the fact that, as a process secondary to the tuberculous disease in the apexes, its final result is usually softening and the production of a cavity. The patient may recover, often in an apparently satisfactory manner; but such an attack is always a very serious affair, for, on the one hand, the patient may remain incurable, or, if he is to recover, will do so only after a prolonged stay in bed and a subsequent course of treatment which may extend over years.

The secondary pneumonic attack constitutes, as it were, the great alarm gong in this disease, and too often it gives notice that the latter is already incurable.

Fortunately, it seems to have been shown that these pneumonic attacks occur almost exclusively among patients persistently subjected to excessive strain and overwork, and that those who undergo rest treatment are almost completely protected from this fearsome complication.

In practice, it is a matter of common observation that many tuberculous patients seek medical advice at the time of their third or fourth bacillary attack, at a time when they themselves, in common with their relatives, are still convinced that the disease is only in its incipiency. Pseudo-chlorosis of puberty, anemia of the period of active growth, dry pleurisy or pleurisy with effusion, small tuberculous infarcts of the upper lobes or of the interlobar pleura have occurred one after the other and been variously labelled.

but only the severe pneumonic attack has succeeded in opening the patients' eyes to the true condition.

The moral from all this is that pulmonary tuberculosis must receive proper treatment as soon as it is detected, and that no liberties may be taken in disregarding its earlier warnings.

V. If one is desirous, in view of the above clinical course of the disease in the vast majority of cases, of ascertaining to what gross pathological changes these clinical phenomena correspond, especially during the earlier stages, the following conclusions, reached through many years' experience, will probably be found reliable. These conclusions perhaps represent rather a personal viewpoint, but they have proven so serviceable to me in ascertaining and following up the progress of pulmonary disease that their presentation here may be of interest.

The first perceptible manifestation of apical tuberculosis occurs at the upper margin of the apex of the lung, about midway between the root of the neck and the shoulder. The lung tissues in this locality may conveniently be spoken of as the *areas of implantation* of the tubercle bacillus. Such areas are met with in children and adolescents as well as in adults, but more especially in children and adolescents presenting one of the common symptoms or symptom-complexes due to what was so long called, and is still called, *pretuberculosis*—a term applied because the tuberculosis, while already present in a more or less active form, is not strikingly evident to all.

These areas of implantation are, in my opinion, always bilateral. They make known their presence by causing a more or less pronounced tenderness to finger palpation. The area on the right side reacts, perhaps, more strongly than that on the left, but this is not an invariable rule. They

likewise make known their presence very particularly in being accompanied, in general, by one or more small, indurated lymphatic nodes in the supraclavicular space, rolling beneath the finger like leaden shot and often sensitive to pressure. Finally, they present in varying degree a few physical signs elicited by percussion and auscultation.

For as long a time as secondary infiltrations have not invaded the vicinity of these areas, the latter may continue to present, without any change and for years, the features already described; and even when they have become fused, as it were, with the neighboring lesions, they may still be detected through the exact localization of the coexisting tenderness to digital pressure.

These areas of implantation, in spite of the general torpid tendency they exhibit in many cases, may themselves become active when, the vitality of the tubercle bacillus having been awakened in the local tissues, they give rise to some form of progressive tuberculous involvement, either directly in the areas themselves, in their immediate vicinity, or in more or less remote tissues, thus constituting foci for the dissemination of tubercle bacilli. Under these circumstances, either the usual type of infiltration of the apexes is found developing about them; or, somewhat further off, superficial or deep nodular foci are formed, with or without accompanying dry inflammation of the visceral pleura; or, at a still greater distance, remote embolic foci result, inducing attacks of destructive pneumonia or pleuro-pneumonia which may occur at any point in the lungs, though usually situated in their middle portions—pneumonic attacks which constitute, as has already been pointed out, the chief factors in the production of tuberculous cavities.

Our knowledge of the minute structure of all these secondary formations is very comple

is less well known is the link by which they are united to the initial lesion in the apex, the route travelled by the infective agent when about to implant itself at some more or less distant point. Extension of the process may be ascribed either to continuous progression through neighboring tissues, to transmission by way of the blood and lymph channels, or to transmission through the bronchial tree. Either one of these possibilities may represent the actual condition, according to the individual case.

## CHAPTER V.

### MORTALITY FROM TUBERCULOSIS.*

WHEN one reflects upon the fact that ever since tuberculous subjects have existed on earth, each patient has been carelessly expectorating wherever he is and freely disseminating the infection all about him; and when it is remembered how many are the causes that may produce in the human subject a state of reduced general vitality, in which he is unable to resist onslaughts by the tubercle bacillus, the enormous death-rate from this disease is readily understood. Tuberculosis is, indeed, the greatest scourge of mankind.

Considering merely the effects of tuberculosis in France, it is readily estimated that the loss of life in that country alone averages 150,000 yearly. This figure is undoubtedly below the actual number, but is sufficient in itself to make one shudder. No scourge is to be compared with this one. Asiatic cholera, bubonic plague, influenza, and other great epidemic diseases are insignificant next to it, for all of them are merely intermittent, while tuberculosis is continuously at work.

And what human material is sacrificed in this horrific tribute to disease? All that is young and vigorous in the nation, since it is at the close of adolescence, when man leaves the familial fold, and at the start of adult life, that tuberculosis strikes down the majority of those who should have continued to live. The disease thus claims its victims among those upon whom the nation builds its fondest hopes.

All these facts are highly alarming. But what is still more painful is the thought that in the face of this plague which is decimating humanity, little or nothing has ever

been done to set up a definite obstacle to its overpowering invasion. Practically nothing, it may be said, has been accomplished, aside from the efforts of medical science to cure those already afflicted with the disease; and if, indeed, in certain restricted fields, effective measures have been taken to prevent tuberculosis from harming persons in more or less close contact with patients, the physicians themselves are alone to be thanked for it.

One word of consolation, nevertheless, can be uttered in the face of these continual disastrous results, since it has been amply proven that pulmonary tuberculosis is recovered from if treated in time.

At least 150,000 consumptives die in France annually. Some say 170,000, and others even 200,000. Let us take it that out of this number, 150,000, 20 per cent. are incurable from the start—some because their tuberculosis is said to be "acute" and is as yet entirely or practically out of the range of our therapeutic measures; the remainder because they lack the physical resisting powers necessary to keep up the fight. There remain 120,000 that are open to the possibility of cure.

Now, we may take it as an actual fact that if society were so organized as to be able to care properly and in time for these 120,000 unfortunates, 100,000 would recover. Each year, 100,000 persons would be saved from death! Since, in conjunction with their recovery, they would be kept from infecting their fellows, the morbidity figure would perceptibly diminish. We would then be, not on the road toward the extinction of tuberculosis—unfortunately—but toward reduction of consumption to the status of an ordinary endemic disorder. Indeed, it would finally become clear that among the so-called chronic affections, tuberculosis is one of the most readily cured.

Little thought is required to show that treatment set up with a view to curing the consumptive patient is but a makeshift. The ideal procedure would be to keep consumption from developing, or better, to aim toward extinction of the disease, or at least its attenuation, as has already been accomplished in relation to so many other epidemic diseases.

Reference was just made to one of the factors in this preventive treatment, *viz.*, the destruction of bacillus-laden material, the sputum in particular. This is manifestly only a subsidiary measure in reducing the immense field of tuberculous infection.

The great, radical, though somewhat utopian procedure would be to place the human subject under such conditions of hygiene as would enable him to meet the onslaughts of the disease from the start. This is a great social question, solution of which in the future seems possible, though only after a long period of time. If man were to be, indeed, invulnerable he would have to enter the world free of any inherited defect that rendered him susceptible to tuberculosis; he would have to be brought up under such conditions as would conserve for him his original bodily resisting powers; none of the diseases at present still unavoidable could be allowed suddenly to strike at him and place him in a condition of reduced vitality; he would, in particular, have to know how and be desirous, during adolescence and adult life, of living a wholesome life free of all excesses, and finally, distress and extreme poverty, of whatever cause, would have to be banished from the earth.

In the meantime, while awaiting fulfillment, more or less complete, of these happy dreams, the best procedure for us to follow is to take good care of all those who have the misfortune to become tuberculous.

## CHAPTER VI.

### CURABILITY OF TUBERCULOSIS.

TUBERCULOSIS had, in general, been considered an incurable disease. Nevertheless, some consumptives did get well, and entirely well, in spite of all obstacles. In all ages and in all localities there was knowledge of some particular individual who, after having been declared a consumptive at one time, was nonetheless living and in excellent health some twenty, thirty, or even fifty years later. It was stated that these persons had formerly coughed up their lungs; that finally they had had but one lung left. These cases were cited as instances of miraculous recovery. True, the wiseacres claimed that such was an impossibility, and that there was nothing to prove that the doctors had not made a mistake.

These "miraculous" recoveries occurred simply through the fact that most of the individuals concerned had robust constitutions and that receiving, for the most part, better counsel than other patients, they had given up active pursuits for life in the country, at rest, and in the open air. Beneficient hygienic measures, their originally sturdy constitutions, and sometimes medical care had enabled them to wage a successful fight against the tubercle bacilli.

Among all these survivors of the fateful battle, some were—and are still, for what was true of former days applies at the present time—completely cured, and retain only a memory of their former illness. The remainder continue to experience some difficulty in breathing; some cough throughout their lives, either because their lung contains a well walled-off cavity, because they are holding their own against torpid tuberculous lesions, or because they re-

tain from their former tuberculous disease extensive pleural adhesions, pulmonary emphysema, etc. Whether completely cured, or simply tuberculous invalids, they are spoken of as living with but one lung.

The above facts constitute what observation on the part of the laity has thoroughly established. In brief, tuberculosis is occasionally cured.

To those who claim that in the majority of instances these were wrongly diagnosed cases, post-mortem examinations conducted in institutions for the aged have long since given a conclusive answer. Nothing is more common than the discovery, among subjects succumbing to any of the affections usually causing death in old people, of evidences of a former tuberculous process in the lungs. Sometimes these evidences consist of scars riddled with minute, encysted tubercles; at other times they consist of large cheesy tubercles buried in a thick fibrous shell; or again, there may be cavities that had formerly been tuberculous, but had later been so transformed as to consist solely of fibrous tissue and mucous membrane.

Thus the fact must be recognized that tuberculosis not only is curable, but may be spontaneously recovered from. Indeed, many of these aged subjects showing post-mortem evidences of healed tuberculosis have never known that they were tuberculous at a certain period in their lives, and their status in society would hardly seem to warrant the supposition that they had ever received any special treatment for this disease.

Tuberculosis is a disorder which, in its acute varieties, sometimes becomes arrested; opportunity is then given for the patient to become a chronic tuberculous subject.

Again, in its chronic forms, tuberculosis often terminates in spontaneous recovery. Many are the persons who, with

sufficiently robust constitutions, have passed through an attack of tuberculosis without its ever having been diagnosticated or treated as such. When young persons who have come for the open air treatment for an already alarming lesion are questioned, they frequently relate the following type of history: "Two, three, or four years ago, I first became ill. I coughed, lost weight, and had no appetite; the doctor told me to go get my cold cured up in the country. I spent three months there in idleness, and came back well. I went back to my former work, and last year I began to cough again."

These are instances of tuberculosis undergoing spontaneous recovery solely from the fact that the patients went "back in the fields" for a few months. Their recovery was, however, only an apparent one, because they failed to follow the treatment long enough. Had their physician told them that their "cold" was actually an attack of tuberculosis, and that to become entirely cured of it they would have to rest in the country for eighteen months or two years, they would probably never have had a recurrence.

Finally, tuberculosis in its chronic forms would be recovered from oftener if it were diagnosticated at once and the patient received proper care.

This fact has been plainly demonstrated by physicians in charge of institutions in which tuberculous patients are actually given the care they require.

Since, on the whole, many patients are so situated that they can make a certain amount of financial sacrifice in order to be cured, the first thing to be done is to detect the disease as soon as possible. In the next chapter certain facts relating to the necessity and possibility of such an early diagnosis will be presented.

## CHAPTER VII.

### THE NEED OF EARLY DIAGNOSIS IN TUBERCULOSIS.

TUBERCULOUS patients must receive treatment at any stage of the disease, to be sure; but from what has already been said it is quite plain that the earlier in the course of the disorder the patients are placed under treatment, the better the chances of a favorable outcome. Hence it is all-important to be able to detect pulmonary tuberculosis from the start.

Early diagnosis is required of the physician in order that he may exert his authority, insofar as he may be listened to, to insist upon early treatment.

It is useless to talk of the cases in which lung involvement is so far advanced and the general condition so bad that the probable nature of the disease is clearly apparent even to those living with the patient, who, moreover, himself knows that he is seriously ill. In the earlier stages, however, it is an entirely different matter.

Let us mention, first of all, the type of case in which a person develops an accidental fever and goes to bed with a pulmonary attack which, according to circumstances, may be labelled "a cold," bronchitis, congestion of the lungs, bronchopneumonia, pleuropneumonia, etc., and which, furthermore, is likely to be ascribed to exposure to cold after being overheated or to "grip."

From the start it should be stated as an axiom that any cold or bronchitis limited to one side is to be considered suspicious; and if such disturbances are confined to the lung apexes, the suspicion is doubled in value. Likewise, any

bilateral bronchitis at the apexes is deserving of special attention.

Whether the condition be a bronchitis, congestion of the lungs, or bronchopneumonia, examination of the sputum for tubercle bacilli is imperative. If the sputum is very copious, a single negative examination is without significance, and it is advisable to wait until the sputum has been greatly reduced in amount and is more concentrated, before examining for the bacilli again.

To be sure, this last is of less importance than formerly, for in recent years examination of the sputum for tubercle bacilli has frequently been carried out with the improved procedure of homogenization and centrifugation, which leaves but slight chance for error in comparison with the earlier procedure of simple microscopic examination for the germs. When the patient appears to have successfully passed through the major disturbance, fever has subsided, and convalescence has set in, if the bacilli have not been found, the physician should not yet express himself as being satisfied with the situation, but should make a thorough examination of the apexes of the lungs.

If these prove to be in perfect condition, well and good, and one of the "labels" already referred to can be definitely applied to the attack. But if the least doubt remains as to their integrity; if the least residuum of adventitious sounds persists; if digital pressure discloses a fixed point of tenderness there; or if, in examining the supraclavicular spaces, there are discovered, rolling beneath the finger like leaden shot, a few small enlarged lymphatic glands, the physician must be very guarded in his expressions concerning the outlook, in spite of all appearances, and must treat the patient as though he were a definitely recognized case of tuberculosis.

If the case is an ambulant one, the patient living practically like any one else, as is usually the case, he begins to complain and seeks the physician's advice because he actually exhibits some of the characteristic signs of tuberculosis. Obviously, if he has a bad cough, is expectorating, and presents abnormal sounds at the apex of the lung, the diagnosis is unmistakable, especially when supplemented by microscopic examination of the sputum. But the possibility of tuberculosis should not be excluded if the examination for bacilli proves negative, for in at leasf 9 cases out of 10, the lesions will actually be tuberculous. Other possible causes of such tissue changes are too uncommon, though, of course, they should always be borne in mind.

Where a subject is not expectorating, too often he is merely one of those patients who swallow their mucous discharges instead of getting rid of them; and too often, again, both the patient and his parents will insist that since there is no sputum, the disease cannot be tuberculosis—only too glad as they are to be still able to delude themselves in this way.

But where there is the least suggestion of a moist sound in the apexes, it is not possible for expectoration to be completely absent, and if the physician lays stress on this point, a day or two later he will be shown some specimen of sputum coughed up the same morning. The stress laid on it will have been sufficient to transform a case of "closed" tuberculosis into one of "open" tuberculosis. Definite evidence of the disease will have been obtained, and mayhap the patient and family will then become convinced as to the true condition. So far, however, what has transpired has been merely child's play for the physician.

The real difficulty begins when the patient, as in the preceding case, generally a child or adolescent, is causing

some anxiety by reason of certain abnormal phenomena none of which has any great value when considered alone, but which, taken together, constitute reasonable evidence of incipient tuberculosis; the physician auscults and finds nothing, or at least finds so little that he is left in doubt, and cannot depend upon such slight evidence to assert definitely that tuberculosis exists.

In such cases he should put it down as a rule that, in spite of everything, the very fact that he was led to think of tuberculosis indicates that it must actually exist, and he should pursue his inquiry further.

The few traces of adventitious findings detected during examination of the apexes, anteriorly, posteriorly, and on both sides, should first be grouped, and next, points sensitive to digital pressure above and below the clavicles and the supraspinous fossæ sought. The small leaden shot rolling beneath the finger in the depths of the supraclavicular spaces should be examined for, and if found, the physician should consider himself conscientiously authorized to diagnosticate incipient tuberculosis.

One more source of information will often serve to remove any lingering doubts. The patient should be allowed to walk about and act as if he were in complete health. Then, at four or five o'clock in the afternoon the oral temperature should be taken; if the thermometer reads 37.3° or 37.5° C. (99.1° or 99.5° F.) on two or three successive days under the same conditions, the diagnosis already reached may be said to have been confirmed. Even slight overexertion in a tuberculous patient, whether during incipiency of the disease or later, is sufficient to induce a rise in temperature lasting at least an hour or two.

Even if, among the patient's family, the diagnosis is held to be very premature and poorly substantiated, and the

warning is not duly taken into account, the physician need not feel disturbed, for there are nine chances out of ten that a few months later a frank attack of tuberculosis will appear, justifying his diagnosis. Advantages of the highest importance are to be derived from early diagnosis.

Obviously, if pulmonary tuberculosis were regularly detected in the somewhat doubtful period just referred to, and if the patient and especially the family placed entire faith in the physician's judgment, matters would be greatly simplified. After a few months of rest and of natural life in the open air, four-fifths of the incipient cases could be put back on their feet again, the other fifth—as a matter of fact, a considerably excessive ratio—being excepted because they would succumb anyhow at some time or other, their constitution being insufficient to keep up the fight, and were from the start doomed to be victims of the great reaper.

Once restored, these tuberculous subjects, at least apparently in a state of complete recovery, would have only to bear in mind that they had at one time been infected and, being forewarned, to follow out a hygienic plan of living which would protect them from all recurrences.

So far, in the discussion of the means of making an early diagnosis, only the procedures of investigation available to all practitioners have been referred to. In addition, however, there are available certain procedures that have gained great favor in recent years and are certainly calculated to render great service in many cases. One of these is x-ray examination, which, however, cannot be expected to disclose lesions in the apexes so mild that they escape the ausculting ear.

Another is the diagnostic administration of tuberculin by one of various routes: Subcutaneous injection, intradermal injection, and the ophthalmo-reaction.

Unfortunately not all physicians have an x-ray laboratory at their disposal, and while the tuberculin test is rather easily carried out, this test has neither been demonstrated to be infallible nor invariably harmless.

On the whole, it seems to me that the practitioner may always render an early diagnosis of tuberculosis by simply basing himself on three means of investigation available to all, *viz.*:—

(1) The symptoms as a group.
(2) The local signs as a group.
(3) Microscopic examination of the sputum.

# PART II.

## The Rational Treatment of Tuberculosis.

### CHAPTER I.

#### FUNDAMENTAL FEATURES OF THE RATIONAL TREATMENT OF TUBERCULOSIS.

THE various forms of treatment instituted from time immemorial with the object of curing tuberculosis may be grouped under two headings, *viz.*, medical treatment and hygienic treatment.

As a matter of fact, during all periods of human history the most varied and startling medicinal remedies have been administered to consumptives; medication has been vouchsafed either under scientific control or through the most arrant popular empiricism—not to mention the element of superstition also often involved. It is also a fact that every single thing that could be termed a remedy has been tried, whether the agents were such as required to be taken by mouth or were injected under the skin. Unfortunately, all this constitutes proof conclusive that no trustworthy remedy has ever been available.

Likewise, during all historical periods, the wisest practitioners have supplemented the medicinal treatment with the inculcation of excellent hygienic precepts. And occasionally a consumptive recovered.

When the bacillus of Koch, the exciting cause of tuberculosis, was discovered nearly forty years ago, experiments were performed showing that a host of chemical and

physical agents were capable of destroying the bacillus *in vitro* or of markedly reducing its reproductive power. Innumerable medicinal treatments were thereupon brought out, each agent being claimed to pass into the body tissues to kill the Koch bacillus or attenuate its harmful effects. All such attempts, however, were soon given up for the simple reason that agents capable of killing the germ in the laboratory in a given amount, or better, in a given concentration of solution, would have already destroyed the body tissues if administered to patients in the same concentration.

As product of all the above attempts, what has remained? A single drug hitherto considered in some degree antagonistic to the tubercle bacillus, *viz., creosote,* with its derivatives. These are administered by the mouth, into the lungs, by the rectum, by inunction, and by subcutaneous injection, and constitute the remedy that has proven most advantageous and least harmful.

It must be confessed that opinions as to the action of creosote and its derivatives vary widely. Some continue to ascribe to it a specific action against the tubercle bacillus; others deem it simply a medicinal remedy appropriate for both general and local use, contributing, on the one hand, toward stimulation of the organism somewhat like the so-called excitants of the digestive functions, and on the other, toward improving secretory conditions in the bronchi.

It must also be admitted that if creosote actually had an antagonistic action against the tubercle bacillus, it ought, theoretically, to give excellent results in the forms of tuberculosis with active, acute or subacute bacillosis and with more or less pronounced fever. As a matter of fact, it is precisely in these forms of the disease that its use is generally considered inadvisable.

Apart from this drug, enjoying some reputation as a specific, there are to be considered the so-called tonic or alterative agents. *Arsenic* and *codliver oil* still head the list in this category.

In late years chemistry has endowed us with certain arsenical compounds, the cacodylate series, that are much less toxic and more easily controlled than the time-honored salts of arsenic. Under various appellations these are administered by the mouth or injected subcutaneously. Like the old arsenicals, and more rapidly perhaps, they act as temporary stimulants of the vital processes, but they have not shown any evidence of exerting a true antituberculous action.

Much the same considerations apply in the case of the *phosphates*. As it had not been demonstrated that the human system could absorb the simple mineral phosphatic compounds formerly employed, new organic products appeared, including the various glycerophosphates, which are thought to possess in a more or less marked degree, like the newer arsenicals, the property of temporarily stimulating a depressed organism. Finally, in order to make them still more readily assimilable, an attempt was made to give the phosphates in a living form, as it were, by prescribing certain constituent parts of the cereal grains, which are undoubtedly richer in phosphorus.

All these products may be said to belong, as far as present knowledge suggests, to the group of tonic medicaments; but they cannot be classed as antituberculous remedies. For the most part they seem to act approximately like excellent natural flours, which offer the patient an alternative to macaroni, potatoes, and bread.

Codliver oil will be referred to later.

Another remedy which has always proven of some value, and has likewise been brought out anew in various forms, with consequent newly restored popularity, is *tannin*. There is no doubt that many tuberculous subjects whose pulmonary lesions exhibit a tendency toward fibrosis and who are destined, under proper hygienic conditions, to live to be sixty in spite of the disease, seem to derive considerable benefit from more or less continuous ingestion of tannin.

It appears to me established, moreover, that this remedy is useful where a tuberculous subject, with or without cavities, belonging to the group of the curable cases, is beginning to show reduction of fever and of expectoration. Numerous observations have convinced me of its happy effect in accelerating recovery in these cases.

On the other hand, I cannot agree with many of my colleagues who prescribe tannin in cases with high fever. I must confess that I have never seen any benefit from it under these conditions.

The ordinary dosage is 2 grams a day. But often 3 grams are well borne. Only uncommonly do patients not tolerate, and for months running, 1 gram of tannin taken in the middle of each of the two heavier meals in the day.

I usually begin with the tannigen series, ingested according to the above plan for ten days, after which the tannigen is replaced by 0.5 gram of tannin, and ten days later, by 1-gram cachets of the same remedy.

It seems unnecessary to refer to the innumerable drugs or treatments brought forward almost daily and which have in common the property of curing tuberculosis for six months or a year—at the expiration of which they pass into oblivion along with other old timers. Certainly the warning to "Hurry and take this remedy while it is still

curing" can never have been uttered so often as it has in the last twenty years.

The above practically represents the present situation as regards the drug treatment of tuberculosis.

In the laboratory investigations undertaken since the discovery of Koch's bacillus, however, an attempt has been made to accomplish for tuberculosis what the scientific genius of Pasteur accomplished so splendidly in the case of a number of other diseases of man or of lower animals. What is being especially sought everywhere is a prophylactic and curative vaccine for each infectious disease. The discovery of certain serums which have already proven their value should give us confidence in the future. Mayhap we are on the verge of the antitubercle serum or of something similar to it. Such a discovery is a consummation devoutly to be wished for by the whole of humanity.

In view of the fact that the medicinal agents having the property of destroying tubercle bacilli cannot be used in sufficient concentrations to encompass this result without harming our tissues, our faith should, perhaps, be pinned to the treatment with serums and vaccines. For the problem, then, is not one of killing the bacilli with a chemical agent, but of rendering them harmless and incapable of reproduction by injecting into the human circulation organic fluids having the property of rendering it a poor culture medium for these micro-organisms.

It would be inadvisable, in speaking of these great discoveries of the future, to shrug our shoulders and remain too skeptical, laying undue stress on the failure of former attempts to find a method of vaccinating against the tubercle bacillus.

True, Koch's inoculations, over thirty years ago, were often followed by disastrous results. But the fluid he used

was a product of tuberculous reaction and probably not a curative agent. One serviceable application of it has remained, in the diagnosis of tuberculosis in certain domestic animals and more recently in man, as already mentioned.

Since Koch's first *tuberculin,* how many others have been brought out, under various names! A few are still in use in pulmonary tuberculosis.

Some high medical authorities attribute a certain number of recoveries to the tuberculins. It is to be hoped that these favorable results will be confirmed with sufficient frequency to carry conviction and elevate this method of treatment from the state of hesitation in which it is at present.

On all sides diligent search is being made for the long-awaited panacea, and I feel convinced that success will ultimately crown the efforts put forth. In the meantime, however, we shall have to be content with applying against tuberculosis the least ineffective among the medicinal measures at our disposal.

Not only of late have practitioners been prescribing, along with their medicines, more or less enlightened *hygienic regulations.* Such recommendations are, as a matter of fact, to be found set forth at length in the writings of Hippocrates.

Formerly they were limited, as a rule, to advising persons well off financially to go and live in a mild, equable climate, far from the cities, in the fields and the depths of the forests. The conception of a "cold," of chronic bronchitis being predominant, moving to warm localities was counselled, just as a person suffering from a common cold was advised to keep himself warm in his room. The tuberculous patient in winter repaired to sunny districts, spent the day in the open beneath the blue expanse of the

heavens, and when the sun had set, returned home and covered himself up with blankets. Fortunate were those who, under the influence of rest, being free of fever, were able to take plenty of food. A few of them got well. The majority, however, lost in the summer what they happened to have gained during the winter, and passed away after having made a few annual journeys to southern climes. A considerable number, indeed, yielding to the pleasant pursuits afforded in the resorts they visited, succumbed more promptly than they would have elsewhere.

These statements would appear to apply especially to conditions as they were formerly; but even today, too often these same conditions obtain. Where a patient is well off financially he spends his winters in southern resorts. In the summer time he returns to his properties, hunts, rides horseback, or motors about. After a variable number of years spent in this manner, he dies, either at home or in the winter resort. And no one appears surprised; it corresponds so closely with the natural course of events. "Such and such a person is dead," one hears; "that's so; for several years he had been spending every winter in a southern resort!"

Of late, however, it has been happening rather frequently that after a few of these trips to sunny districts the patient, finding that he is not improving, makes up his mind to go to one of the special institutions in which tuberculosis is systematically treated. But often, it is already too late.

To be sure, one must not get the idea that all patients who spend their winters in southern resorts are bound to die. Fortunately, there are many exceptions to this rule.

But it is not sufficient for the patient to go where the blue sky is visible while the weather is cloudy somewhere else; it is not sufficient to get warmed beneath the

southern sun when people are freezing in the north. These influences alone will not kill the tubercle bacilli. To recover from tuberculosis, something radical must be done; a fight must be waged.

What, then, actually is the fundamental factor in the treatment of lung tuberculosis?

In the first place, the theory as to the origin of the disease tells us that a person contracts tuberculosis because he has sunk into a condition of physical depression, because he has become a favorable culture medium for the tubercle bacillus through having lost his natural means of defence against the onslaught of this enemy that is constantly lying in wait for him.

By the same token, as long as we are not possessed of any specific remedy, it is necessary for us, since tuberculosis is acquired through enfeeblement and wear and tear, to "reverse the engine"—to use a common expression—in so far as is within our power. Our depreciated system must be raised up to par again. Everything available in the way of hygienic measures and therapeutic agencies that have proven useful in restoring the human economy must be utilized with this end in view. If there is still time; if pulmonary tuberculosis is still confined to a local lesion; if, in addition the system has enough reserve power to respond to the action of these curative agencies, success will crown our efforts.

What has been mentioned so far constitutes merely theory. What does experience teach us? By what means have those alleged miraculous recoveries of certain phthisical patients, so familiar to all, been secured?

In one case, for example, we have a young man with a position in some city. He has exhausted himself through overwork or all manner of excesses, and contracted tuber-

culosis. He has fallen into the hands of a physician who has made a farmer out of him, at least for a certain period of time.

Another instance is that of a business man who, having contracted tuberculosis, left the city and his business precipitately and went to spend his meager savings in some out of the way country place.

These voluntary exiles put the necessary time to it—and got well.

What did they really do? They fled from the deplorable hygienic conditions in the cities, their pestiferous atmosphere, their pleasures and struggles, and the cares of business. For all these unfavorable factors they substituted rest and an atmosphere constantly pure; their processes of assimilation were restored, they gained weight, they became stronger than the tubercle bacilli that had been nibbling away at them; they regained their physical equilibrium and consequently also their natural means of defence. They fought, and remained victors on the field of battle. They may or may not have taken remedies. Formerly, codliver oil was in great favor. Fortunate were those who could take it in large doses. At the time it was, indeed, the best auxiliary remedy at hand, acting in conjunction with the improved hygienic conditions. But it was the hygienic conditions that cured these patients, and it is their example which we must now follow.

If many tuberculous patients have cured themselves by such simple means, it will be asked, does it not seem a very simple matter to apply these same procedures in all cases. Theoretically it is, to be sure; but in practice, circumstances are different.

The world is so ordered that tuberculosis, a disease of poverty, is hardly curable except among those who are

fortunate among men—the well-to-do. To break away suddenly and completely from one's ordinary mode of life, one must have means. While private or official charity supports and prolongs the life of the needy consumptive, only rarely does it succeed in restoring him to health.

Again, one should not conceive the idea that all consumptives, when first seen, appear to require identical treatment. They may be divided into several groups.

Some tuberculous subjects recover spontaneously, without or practically without any special care, and even without having themselves suspected that they harbored the disease. These patients represent the unfavorable soil, upon which was cast a seed that failed to germinate properly. Thus, could it be supposed for a moment, as already pointed out, that most of the old, indigent subjects coming to autopsy and in whom local, walled-off tuberculous lesions were found, had ever been personally aware that they were tuberculous and had ever taken any special care of themselves on account of it? As a matter of fact, the tubercle bacillus had gained only a temporary foothold in these individuals.

Let it not be imagined, in particular, that the many instances of recovery following hygienic treatment were due to the fact that many among the patients treated belonged to the preceding group. To do so would be a serious error.

There are some tuberculous subjects who can never get well even when diagnosed, warned, and placed under treatment at the very outset of the disease. To use a popular expression, they are not made of the stuff that resists. Their tuberculous infection is a terminal condition to which so many powerfully acting causes have contributed that it is impossible for the organism to turn back and make head against the downward current. Their lives may be prolonged, the hour of doom postponed, but that is all.

There are some tuberculous subjects who, if diagnosed, warned and placed under treatment in due time, will nearly always recover. Such subjects should constitute the great majority of all cases. But as yet the opposite condition prevails; they constitute only a minority.

There are many tuberculous subjects who, after belonging in the preceding group, have passed out of it. In these individuals, through lack of proper counsel, care, facilities, and too often, of personal effort, the disease has made such headway and the general condition been so impaired that no possibility remains of "reversing" and of carrying on the fight.

Finally, there are some tuberculous subjects who, while harboring serious lesions, have remained in a relatively good, and sometimes excellent, general condition. They do not often recover; but, if subjected to rational treatment, they may succeed in prolonging their lives indefinitely, reaching a state of relative recovery compatible with continued life. Either they hold their tubercle bacilli at bay for an indefinite time, or, having finally got rid of the bacilli, they nevertheless continue to harbor pulmonary lesions which have lost their specific, tuberculous nature but are wholly incurable. The latter cases form part of the category of infirm individuals, turned into invalids by tuberculosis.

Granting, of course, that all the chances of recovery are in favor of the members of the third group, when the physician encounters a case of incipient tuberculosis whose robust constitution gives grounds for hopefulness and in whom the general condition has not yet been permanently undermined; or is confronted with a case exhibiting a more or less extensive localized lesion—a case which he may be led to consider simply as susceptible of improvement in

view of the relative absence of impairment in the general state—what course should he follow?

He should prepare his patient for undergoing the rational course of treatment for tuberculosis.

In the first place he should apprise him and his family of the existence of tuberculosis; that, for the time being, the trouble does not amount to much, but that later, or even soon, it will constitute consumption, and that if he begins to take care of himself at once, he has every chance of recovering, whereas if he relies on his apparently more or less favorable state of health, he is almost sure to die. To convince his patient of the facts, the physician should bring to bear all known means of persuasion, including eloquence. If opposition develops, he should summon one or more colleagues to support him. He should carefully explain the disease to the patient, and should, if there is expectoration, show him the guilty agent, *viz.*, the tubercle bacilli.

It is his duty to combat the terrible prejudice among families who wish the tuberculous patient to be kept in blessed ignorance of the nature of his illness.

He must insist upon immediate treatment, for weeks of delay in reaching necessary decisions subsequently mean months of additional treatment.

Finally, he must, though apprising the patient of the disease, undertake to cheer him up, explaining to him that such is the only true method of obtaining a cure—a cure which he will surely obtain, if he only makes up his mind to it. The physician must invariably adopt these energetic measures for the following reasons:

In the first place, he saves his patient if it is possible to do so. This circumstance alone is sufficient.

Next, he protects himself against fearful reproaches that might be heaped upon him subsequently—and justifiably so.

These circumstances bring in an element of medical responsibility which he has not the right to disregard.

How many times, upon receiving a patient in a more or less seriously compromised condition coming to place himself under systematic treatment, I hear the following distressing story, which is always the same. The mother or father says: "Doctor, it was six months, it was a year ago . . . that my son became ill. He coughed a little, and almost never expectorated, but he lost ground from day to day. The doctor we generally have did not seem to be worrying about it. 'But, doctor,' we would say to him, 'it isn't natural; some serious trouble is developing in this boy!' And our doctor replied that it was a cold, a mild attack of bronchitis; that it would soon pass off; that he should be given respite from his studies, should be told to play around and take some exercise, and so forth. Finally, some friends of ours sent us to see Dr. A——, who informed us that our boy had tuberculosis and that his only chance of recovery was to come to the sanatorium. Oh! If our physician had only told us right away, our poor child would not be in such a condition! Etc."

Others have consulted two or three physicians in their neighborhood or town, and only Dr. C——told them what the trouble really was.

These good people are entirely justified in accusing Dr. A——, or Dr. B——, of carelessness for if, instead of soothing them with pleasant illusions, he had put plainly before them the question of life or death, their son would probably not be in his present unfortunate condition.

Too often it is not the physician to whom such a reproach is applicable; but the family who should blame themselves—too late. They had ears, but they were unwilling to listen.

Thus it is absolutely the practitioner's duty to diagnosticate tuberculosis and make its presence known to the patient when the case is curable or susceptible of improvement to a degree equivalent to relative recovery. This duty is all the more binding in that the diagnosis of tuberculosis is now very easy in 99 cases out of 100, thanks to microscopic examination of the sputum. Accordingly, even if he is in doubt and if no bacilli are found in the sputum, he must, if tuberculosis is the only condition that can account for the patient's condition, make known his fears to the patient and insist upon his undergoing, at least provisionally, the necessary course of treatment.

It is quite plain, as a corollary to all the above, that in a tuberculous case having no chance of cure or of noteworthy improvement, a consumptive doomed to more or less early death, it is incumbent upon the physician to conceal from the patient his unfortunate situation, if he is still unaware of it. Tuberculosis being a disease of illusions to the last, one should take great pains to maintain that mental quietude which some patients are fortunate enough to preserve until the end.

Again, it must not be forgotten that the physician will sometimes meet with perfectly curable cases of tuberculosis which, in spite of having the means to take proper care of themselves, absolutely refuse to submit to rational treatment. Here one is confronted with a mental condition, fortunately uncommon, against which nothing can be done. Such persons believe in living a short life and a merry one; it is a case of deliberate suicide.

In such instances the physician fulfills his duty in striving to bring back the stray lamb to the fold.

Far sadder is the distressing situation he encounters in the case of a patient who is curable, but has not the means

required for proper care. Here it is necessary to use tact. Inquiry should be made as to the social status of the patient before he is informed of the nature of his illness. The situation is a deplorable one, but what is there to be done about it?

True, in late years there have been established a number of so-called popular sanatoriums, partly pay institutions as a rule, to which a consumptive destitute of funds may be admitted. But these are only of partial service, in comparison to the vast number of curable tuberculous cases in which careful treatment would be well worth while.

Let us now, after the above preliminaries, consider in greater detail the various factors in the modern rational treatment of tuberculosis.

## CHAPTER II.

### THE RATIONAL TREATMENT OF PULMONARY TUBERCULOSIS.

THE main factors in this purely hygienic system of treatment are three in number:

(1) The patient must live in pure air, both by day and night.

(2) All mental and physical fatigue must be eliminated.

(3) The diet must be wholesome and abundant.

This seems very simple, one might remark, and all tuberculous persons, provided they have the means to carry it out, should get well or live for an indefinite period.

In practice, however, matters are not so easy, as we shall later have occasion to show. Before doing so, a detailed discussion of each of the members of the above-mentioned therapeutic triad is in order.

#### I. Open Air Treatment.

What does this treatment by continuous aëration, both by day and night, as it is carried out in special institutions for consumptives, consist of?

It has been conclusively shown that exhalation from the lungs is one of the means availed of by the system in eliminating to the exterior a vast amount of substances toxic to it.

Any person spending the day in a more or less tightly closed room rapidly vitiates the air in it. Soon he is breathing in what he has already exhaled, gradually poisoning himself with the substances already eliminated by excretion through his own lungs.

If one enters, in the morning, any bedroom however large and luxurious in which a couple have spent the night with the doors and windows closed, even if these persons have been as careful as possible as regards body cleanliness, there is noticed at once a characteristic odor. To those with a trained olfactory sense it is a slightly putrid smell. The air in the apartment has been "used up" and become poison-laden, and the occupants have been breathing it in for ten hours out of the twenty-four.

True, these persons do not die from its effects. But nonetheless it is prejudicial to their health if such conditions constantly prevail, for all harmful practices are dearly paid for in the long run. Ill persons could not live under such conditions. An atmospheric medium other than this stale and constantly rebreathed air is absolutely necessary if the tuberculous patient's declining physical resistance is to be brought back to par.

Although less closely sealed in the daytime, owing to the occasional opening of doors, a room constantly occupied by some one is nevertheless poisoned in spite of the draught through the chimney upon which some of the laity place such reliance for ventilation.

No means of ventilation is at all comparable with opening the windows. To be sure, hygienic considerations are receiving increasing attention in the construction of buildings; and in hospitals, quarters with almost completely satisfactory provisions for ventilation, even with the windows closed, are available.

To enjoy constantly a fresh, pure air supply however, one would have to live out of doors. Our living conditions in modern civilization render this impracticable. The best one can do, therefore, is to live under conditions approaching the ideal as closely as possible. One must stay out of

doors in the daytime, and leave the windows open at night.

The open air treatment consists, then, in spending the entire day in premises widely open to the exterior, at least on one of the four sides, and in spending the night in a room well ventilated with fresh air.

Various arrangements may be made for the patient during the daytime. Any form of tent or shed, protected from the wind and generally open on the sunny side, is excellent for the purpose. In fine weather and when there is no wind, the patient may remain entirely in the open on some comfortable chair protected from the direct rays of the sun by the foliage of a tree or by a broad parasol. If there is rain or high wind, however, one of the more stable forms of shelter will have to be availed of.

As the treatment extends over a greater or less number of hours each day, according to the individual case, the patient should be comfortably seated—preferably on a reclining chair of the "steamer" type. His clothing should be adapted for the prevailing season, and he should be kept more or less covered with blankets, as though in bed with his clothes on. Warm footwear should be provided.

The open air treatment must be carried out in the shade—not in direct sunlight. This is a feature of considerable importance. The patient may, if necessary, sit in a sunny spot, but at least his head and trunk should be completely protected from the sun's rays. Even in the winter season, if the sun is rather warm, and all the more so in the summer time he should shun sunny places. Experience has shown that direct sunlight, even in winter, is prejudicial to patients who are not moving about. It may even be harmful to them when walking. Most consumptives are more or less febrile or subfebrile in the after-

noon and evening, and their temperature rises on the least provocation. Under these circumstances they frequently develop fever when exposed to direct sunlight, especially in the afternoon hours. Indeed, a good way to bring on fever in a tuberculous patient who has none and to increase it in one whose temperature is already above normal is to expose him to direct sunlight.

In many southern consumptive resorts where patients are free to follow their own inclinations and naturally seek sunny places, disturbances due to congestion of the lungs from this source are very often met with.

I usually emphasize these matters by stating that in the open air cure the patient should *see* the sunlight, but should *not let the sun see him.* The treatment, then, is carried out in the shade, and whenever the patient walks in the sun he should protect his head and shoulders with a parasol.

The open air treatment must be kept up under all weather conditions, whether it be raining, snowing, or the wind blowing, provided, however, the patient is himself properly protected from the rain, snow, or wind.

Obviously, if he is to spend every day out of doors, he must have clothes of varying weights, adapted to the general climate of the resort and to the season in particular.

Personally, I advise that flannel be worn next to the skin, both summer and winter. In the winter, a complete flannel shirt is used; in the summer, a simple waistcoat. The clothes should be of a sufficiently generous cut to permit of recumbency without discomfort.

In the winter, I have all my patients wear so-called "arctics," with heavily lined cloth boots buttoning up very high above the ankles. These boots are very popular, very serviceable for this type of treatment, and protect against the colds so frequently contracted during the winter season.

On the other hand, scarfs, mufflers and other face protectors are strictly forbidden; their only effect is to maintain a zone of moisture about the neck which is highly prejudicial.

The covering most highly recommended for the winter and equinoctial seasons consists of a cloth cape with large headpiece.

Next, as to the night time.

The room, after the patient has left it in the morning, should be kept open throughout the day. When he returns to it to retire, he closes the windows or they are closed for him shortly before he comes in, while he is getting undressed.

The bed should be placed at a point remote from the window or windows that are to be opened, and the foot of the bed should preferably be turned towards the latter. Before getting in bed, the patient opens the window himself, or it is opened for him as soon as he is in bed.

I expressly recommend that ventilation be secured by opening the window and not by the use of transoms, shutters with slats, perforated screens or glass panes, etc. Nor must the window be opened and the curtains promptly pulled over it. These are childish and entirely inadequate half-measures or even quarter-measures. The window must be opened top and bottom. This is the best way to create a circulation of air from without inward and *vice versa.*

It has been more than thirty years since I have personally followed this plan and nearly as long since I have had it followed by patients in all stages, febrile or afebrile, and I have never found it to have drawbacks of any sort. In fact, no other procedure seems warranted.

The patient very soon gets accustomed to thus sleeping partly out of doors. Whether it be summer or winter, and even in freezing weather, this adaptation only takes a few days on his part. On the first night, the window may be opened 5 centimeters, on the second 10, on the third 20, etc., until presently it is wide open. Patients thoroughly accustomed to the treatment sometimes leave part of the window open in winter, and the whole of it in the summer. Where the room is of some depth, no possible disadvantage attends this custom.

Where the bed is in one corner of the room, the window to be opened is that directly opposite the bed. In this way the air from the outside passes around in a circular manner before mixing with that within.

In the winter it is sometimes well to shield the foot of the bed, which is turned toward the window, with a fairly large screen. The ones we use have four panels and are 1.90 meters high. If no screen is available, a wide sliding curtain with rings on a wire stretched between opposite walls can easily be arranged at the foot of the bed. The wire should be 1.90 meters above the floor and the curtain broad enough to extend 50 or 60 centimeters beyond the bed on either side.

As with the open air treatment in the daytime, this arrangement for the night must be adhered to during all sorts of weather.

[In some instances, as in the case of patients dwelling in suburbs or in the outskirts of a city, a tent, or better, a canvas bungalow, may be used in order to procure for the consumptive the complete benefits of fresh air during his sleeping hours. Properly constructed sleeping porches are also of marked service in this connection, and have acquired great popularity in the United States, alike for the care

of consumptives and as a health measure for the normal subject. To obviate unpleasant dampness of beds left permanently in the open air in moist weather, the use of a bed on rollers, which can be brought into a heated room during the daytime and wheeled out again for the night, has been resorted to with advantage.

In the case of city dwellers, especially in crowded quarters, the so-called "window tent," described by S. A. Knopf, has proved of considerable value for effective continuation of the open-air treatment at night in the patient's home. It consists of a series of 4 rectangular frames made of Bessemer rod, hinged together and covered with thick yacht sail twill, the latter extending also beyond the frames in such a manner as to form a species of cage open only below, where the recumbent patient's head and shoulders pass into it, and on one side, which corresponds to the open lower half of a window. Elongated ends of the twill are tucked under the bedding in order to prevent cold air from entering the room. The bed nearly always is placed with one of its sides directly next to the window. By means of a cord and pulley the tent can be raised from its position over the head of the bed when not in use. Shutters or Venetian blinds on the window side may be used as a protection in stormy weather or to conceal the patient from the neighbors' view. The fact that the tent comes into close contact with the window frame all around obviates any draught of air over the patient, the curved shape of the upper portion of the tent favoring, however, a constant mild circulation of fresh air into the tent as the patient's warm breath rises to the top of the tent and is then directed out of the window. In very cold weather the patient may, apart from the adequate bed covering, wear a

sweater and cover his head with a shawl or woolen cap or helmet.— TRANSLATOR].

The bed covering should be adapted to the temperature outside. The patient should wear a flannel night-gown, to keep his arms warm in case he puts them out from under the covers. Neither the head nor neck need be covered. To do so would, indeed, be an infraction of a fundamental rule of the treatment. During severely cold weather many patients sleep in some form of heavy blouse; the women, in a rather warm jacket. There is no objection to their using such garments. In winter, and frequently during the first cool nights in the fall, persons with sensitive abdomens may wear a flannel belt at night.

With a hot water bottle at the feet and a quilt over the lower portion of the body the patient may thus safely undergo the nocturnal fresh air treatment in any sort of weather.

The room may, if desired, be heated at night, either with a grate fire or radiator. Proper provision must be made, however, so that a draught of air from window to chimney shall not pass over the patient.

Objections raised to the nocturnal fresh air treatment by some of the laity are quite unjustified. The patient does *not* get inflamed eyes from it, and as for the danger of pneumonia through exposure to cold while perspiring, this is likewise a figment of the imagination.

Patients sleeping with the window open do not sweat; or, if they do, this is because their bed covering is too heavy, and in a few days they may become accustomed to doing with less. If, at the worst, there is some slight moisture, the flannel night-dress is there to absorb it and prevent the patient's catching cold. It may be put down as a definite fact that the curable tuberculous patient who has been

having night sweats before beginning the treatment ceases to have any as soon as he adopts the above mentioned sleeping arrangements.

Sanatorium patients, indeed, seldom require any of the drugs reputed to be useful for night sweats. During the last thirty years I have not often had occasion to prescribe them, and even when the indication did occur, it was not for the true sweat of tuberculosis, which wakes the patient up about 3 or 4 o'clock in the morning, but for sweating at 11 o'clock or midnight, met with chiefly among dyspeptics and highly nervous patients.

On one occasion, I was much puzzled for about a fortnight by the case of a young man, entirely curable, only slightly feverish in the evening, who sweated copiously every night, although he seemed to be using the proper amount of bed covering and kept his window open. Prolonged investigation finally revealed that he was taking enormous quantities of fluids at each meal and especially in the evening. The fluid intake having been reduced, the night sweats stopped within forty-eight hours. I have since seen several similar cases.

The fact is not even yet sufficiently recognized that sleeping with the window open is the method *par excellence* for insuring a satisfactory night's rest, in health as well as in the presence of lung disease.

As a general rule, the procedure outlined is quite sufficient to eliminate at once the discomfort so frequently experienced when sleeping in a tightly closed room—the restlessness, dreams and nightmares, and the uncomfortable moist feeling, due likewise to the habit of using too much bed covering, a moisture which in the tuberculous patient is magnified into actual sweats. Patients with continual paroxysms of cough find that these are reduced at once.

Subjects previously sleepless regain, at least in part, their ability to sleep. The headache commonly experienced in the morning is likewise eliminated. The patient awakes in a fresh atmosphere, no longer experiences any dry sensation in his mouth or nostrils, and feels rested and alert.

Such is the continuous fresh air treatment.

This special form of hygiene, in some respects at variance with prevailing lay ideas, applies not only to tuberculous patients in a relatively good general condition, but to all consumptives. It is the procedure of choice for facilitating recovery of patients who are still curable and for improving the remainder. It is likewise the procedure of choice for reducing the discomforts of the unfortunate advanced consumptive, doomed to succumb sooner or later. The poor cachectic individual who no longer has the strength to leave his room, or even his bed, derives immense comfort from this type of treatment and becomes very grateful to the physician who has exerted his authority to impose it upon him.

Instead of stewing in his bed, weighted down with covers, bathed in sweat, in a stuffy and sometimes overheated room, poisoned with his own pulmonary exhalations, reeking with the fever and sputum, diffusing about him the familiar "stale" odor of the consumptive, he is enabled to breathe pure air, hardly notices his febrile condition, perspires less, and has less frequent cough paroxysms.

While it is not within his power to get well, he must at least be given the benefit of this subjective feeling of relative good health.

All arguments notwithstanding, there is not the least disadvantage in causing febrile patients to breathe pure, fresh air; the procedure is useful in every respect.

Lying in a fever in a warm, confined room entails manifold discomforts which render it almost unbearable. Under fresh air treatment the patient experiences the same degree of temperature elevation almost without being aware of it. Often he knows only by the thermometer that he has fever. Many times, too, the side-accompaniments of fever, such as loss of appetite, and even the severe vomiting of consumptives, are eliminated by this treatment.

In a former publication I referred to the instructive case of a patient of ours in whom the fresh air treatment, independently of any other measure, led to cessation within twenty-four hours of an almost incoercible vomiting which was threatening his very life.

In sanatoriums, innumerable instances of this kind have been observed. The attendants are quite accustomed to seeing all the distressing and alarming symptoms of the febrile state disappear as if by magic.

These observations plainly bear witness to the harmlessness and the advantages of the procedures we apply. In the winter season we always have under fresh air treatment on the veranda a number of patients who have fever only in the afternoons and evenings, or in addition are subfebrile in the morning; most of the time they simply record their temperatures without being inconvenienced by the fever in any way.

Patients and even physicians are sometimes met with who claim that open air treatment during the daytime is quite sufficient, and that it is useless to insist upon the night cure, to which some patients at first raise objections. In reply to this it is enough to point out that the course of treatment in tuberculosis is already too protracted to permit of one's wasting any time in it; if continuous aëration

is not carried out at night, one is really wasting nearly twelve hours out of every twenty-four.

When faithfully carried out, the fresh air treatment completely excludes a number of pleasures in which persons in good health indulge.

The tuberculous subject who is earnestly taking care of himself must say goodbye, at least temporarily, to the theatre, movies, concerts, games of various sorts, dining out with friends, etc., in brief to everything involving agglomerations of people in a confined space—not to mention other reasons which render advisable his renouncing these various forms of diversion.

Thus well carried out, the open air treatment is not only a reparative method, and one of the most potent factors in curing tuberculosis, but it also acts as a hardener of the body. From time immemorial this out-door hardening process from childhood on has been counselled for feeble subjects. How often a physician, consulted regarding the health of a child born and bred in the city, puny and often tainted with "scrofula" or some other inherited disorder, is tempted to reply to the parents simply thus: "Make a country boy of him until he is fifteen years old!" How many youngsters, brought up in cotton, as it were; certain to be the prey of pulmonary tuberculosis or its congeners, would later grow up to be healthy men had their parents the courage to send them away to the fields! Why? Simply because life in the open air and in shelters more or less pervious to the elements both by day and night, would harden these little unfortunates, gradually render them immune to the ills caused by atmospheric disturbances, and meanwhile solidly build up their tissues.

Hence the fact that the systematic open air treatment, as applied in sanatoriums, is the best means available of

keeping the candidates to tuberculosis from ever reaching the stage of active disease. It constitutes, then, the preventive treatment *par excellence.*

Among subjects already attacked by the tubercle bacillus, the same need exists for this process of hardening by outside air. Instead of being apprehensive of its effects on them, instead of shutting them up in their rooms on the pretext that they have a cold, they must be filled to overflowing with fresh, brisk air and gradually become accustomed to constant contact with it,—to its traumatic effect upon them, as it were—so that even in bad weather they shall have nothing further to fear from it.

The idea that colds are caught through the lungs, from the air breathed in, is too prevalent. As a matter of fact, they are contracted through the skin surface, and particularly through the extremities.

At least, this is the way it appears to me. A cold is caught where, being in a perspiration or simply in a damp condition—whether this be due to fever, which is uncommon, or to exercise, which is the rule—the body is exposed to cold, especially to cold air in motion; the cold is "caught" because wet garments, shoes, etc., are not removed. Obviously, under such conditions, the persons most apt to become ill promptly are those the least accustomed to contact with the air.

Accordingly the tuberculous patient, to whom it is a matter of considerable importance not to catch cold because a cold often results in complications in his diseased lung, must become hardened by getting accustomed to cold air.

There are many of these simple truths, "as old as the hills," which people seem recklessly to overlook. Some persons are very easily chilled and sensitive to cold; others are not.

Let an individual belonging to the first group be taken to the mountains where the air is brisk and the climate good as a rule, but where the temperature is always lower than in the plains. At the close of his first winter there he will no longer be sensitive to cold.

It seems clear that man in his aboriginal state was able to live in the open like the lower animals and hold his own against all elemental disturbances in primitive types of shelter. Civilization is what made him sensitive to cold.

The tuberculous subject needs to bring himself back to some extent, to this aboriginal state. He needs outdoor life, air, and yet again, air.

This need of pure air, which civilization has caused us to lose sight of, is so natural a need for our organism that patients accustomed to the continuous air cure cannot thereafter endure to be shut in anywhere. Wherever they enter, they are tempted to open the windows at once. Their sense of smell can no longer become tolerant of "stuffy" odors.

Indeed, patients who have recovered through the open air treatment, when they return to their homes, are frequently somewhat of a nuisance to the other members of the family, owing to their mania for opening the windows all the time. This is a wholesome mania, however, which, unfortunately, is lost only too rapidly.

### II. The Rest Treatment.

*A*. It should not be gathered, from the foregoing account of the open air treatment, that this treatment requires almost complete immobility of the patient from morning till night. This factor, indeed, is essentially variable according to the individual case.

The rest treatment is based on the following considerations: The tuberculous subject, to restore his declining strength and enable his body to carry on the battle against the disease, must not only husband his energies, but expend less of them than he acquires. His systemic balance sheet must always show an excess of income over expenditure.

In the first place, he must take in more nutriment than under normal conditions, and he must also use up less tissue than before. For he is compelled not only to live but also to wage a constant fight. If he falls below this necessary standard of systemic power, and even more plainly, if he falls below the normal equilibrium, there are many chances that he will not be able to recover.

Therefore, granting that under the conditions imposed in the open air treatment he is enabled to ingest a sufficient amount of food, and is also able to assimilate properly, he should expend but little, in order to keep up a favorable nutritive balance.

Hence the rest treatment. Hence the need of not imposing any wear and tear on the body either through muscular fatigue or mental and emotional fatigue.

In regard to this second item, the law governing rest treatment must be rigidly laid down. The curable tuberculous patient must be weaned from all anxieties, from all perplexities, and from all arduous and sustained mental activities.

He must bid farewell temporarily to his business, or must leave off his studies abruptly. It is sometimes quite difficult to make the patients and their families understand this unwelcome necessity. It is not easy to convince them that, in order to get well, the patient may, perhaps, have to give up entirely a career already entered upon. But the question of life or death brutally imposes itself. The

merchant must be made to realize that if he continues to direct his business he will die, and that in undergoing the treatment, he is only stepping backward in order the better to leap forward. For being ill, and becoming increasingly ill, he will manage his business poorly, and by the time he is dead, he will no longer manage it at all.

The student should be told that, at the age of eighteen or twenty, he can afford to lose eighteen months or two years to take proper care of himself; that possibly his career is disrupted, but that if he fails to make this sacrifice, he will die, and then it will be still more disrupted, whereas after he has regained his health in the course of one or two years, it will merely be necessary for him to seek a different line of occupation.

Unfortunately the physician often fails in this demonstration. The patient fails to make up his mind, the family will not believe that conditions are as they have been described, opinions vacillate, the subsequent course of events is awaited, and time passes. When the disease has grown worse, fear becomes operative, and the necessary radical measure is decided on when it is already too late. Many times I have been consulted by men still comparatively young, running private businesses, tuberculous subjects who would have recovered perfectly in eighteen months or two years, but who succumbed six months or a year later through not having understood my message.

Happily some do understand and place themselves under proper medical care.

Once having undertaken the treatment, the tuberculous patient must abstain from intellectual fatigue. He may read for short periods, provided the matter read is of a light character; he may write to his family, but the letters should be as brief as possible; he may perform light physical

tasks, more in the nature of amusements than anything else (in this, women are far better situated than men); quiet and short games,—such activities as these are compatible with the rest treatment. Anything involving sustained tension of the brain must, on the other hand, be excluded. Thus, not only must prolonged conversations and discussions be interdicted, but even lengthy visits and conversations in the patient's vicinity are prejudicial to him. At first they occupy his attention, later they grip his mind, and finally they annoy him, excite him, and increase his evening rise of temperature if he is already a febrile case. It is a matter of common observation in hospitals that on the days when visitors from without are allowed, all the febrile patients show a greater evening rise of temperature, both those who have had visitors and those who have not.

Quiet about these patients is thus imperative. And what is, perhaps, somewhat distressful to the parents is that the attendants must restrain all undue manifestations of tenderness on their part. Often, in trying too hard to cheer up or sympathize with the patient, the parents overstep their intentions and do him appreciable harm. Tuberculous subjects must be, to a certain extent, left alone. Excessive expressions of interest on the part of the family are often enervating to them.

Later, when the patient is getting back toward normal health, he may be allowed a little more freedom from all these restrictions, but only in accordance with the physician's orders and under his guidance.

As for physical exertion, a deplorable conception has been prevalent to the effect that patients should be advised to exercise and take walks, on the ground that these promote appetite.

In general, such is the case in healthy individuals; as a rule, even the tuberculous patient, if free of fever and robust, finds advantage in indulging in moderate exercise, carefully supervised by the physician.

But in a tuberculous patient who has fever every evening such a practice is generally followed by deplorable results, and, indeed, this is only to be expected from the theoretical standpoint. The unfortunate patient is already without appetite; in fact, he often experiences a marked distaste for ordinary meals. He spends part of the day walking about, in spite of his breathlessness, in spite of his limbs that can hardly carry him, nevertheless plodding along bravely in order to satisfy the family's wish and often with the personal conviction that it will do him good. He uses up his muscles and nervous system, and poisons his tissues and blood with the resulting toxic products of organic combustion. This is an additional source of infection for him, intoxicated as he already is by the poisons of fever and by products absorbed from the diseased areas in his lungs. Instead of having merely to eliminate the products of one form of disturbance, he now has to deal with two. Becoming increasingly poisoned, his appetite wanes more and more and he loses ground visibly. The evening fever is higher, and the morning temperature is no longer normal. The unfortunate patient, however, now comes to tell the doctor that he is much pleased because he no longer sweats at night. The fact is that he no longer has sweats because his temperature no longer goes down at night; he now has continuous fever.

Exercise allowed the tuberculous patient must be intelligently regulated by the physician according to the case. The amount to be permitted depends upon a large number of different factors inherent in the individual patient. No

indication, however, is more precise than the manner in which patients react by a rise in temperature. The best means of making a proper decision is to rely upon the thermometer.

Every tuberculous patient under treatment should have his own high registering thermometer of good quality. He should know how to take his temperature. Whether this is done by the rectum, in the axilla, or under the tongue is of little significance, provided the same procedure is always followed.

For greater convenience, patients generally take their temperature by the mouth. It should be borne in mind, however, that when the weather is a little cold, the mouth may be cooled down sufficiently to give thermometric readings several tenths of a degree centigrade too low. This is a source of error, leading to unexpected results, with which one should be familiar. The deepest recess of the armpit, better protected by masses of tissue, yields much more correct temperature readings. The patient should always take the temperature in the same axilla, for very frequently the temperature is not the same on the two sides.

In a man at rest, under normal conditions, without any special precautions such as covering over the base of the axilla with cotton after the thermometer has been placed in position, the temperature reading is generally 36° to 36.5° C. (96.8° to 97.7° F.)—sometimes lower, sometimes a trifle higher. For practical purposes, a tuberculous patient whose axillary reading is not above 36.5° C. in the morning may be considered afebrile at that time. In most patients considered afebrile the temperature rises to 36.7° or 36.8° C. (98.06° or 98.24° F.) in the evening.

The rectal temperature is very reliable and easily taken in patients confined to bed. It should be borne in mind that

it is generally three to five tenths of a degree centigrade (0.54° to 0.9° F.) higher than the oral temperature in tuberculous patients with fever, while often it hardly differs from it at all in afebrile or almost afebrile patients.

As already stated, we take records exclusively of the oral temperature of our patients, for various practical reasons, and all statements that follow are based upon thermometric readings thus obtained.

In general, an afebrile tuberculous patient who takes his oral temperature at rest gives a morning reading of 36.6° to 36.8° C. (97.88° to 98.24° F.) and an evening reading of 36.9° C. (98.42° F.) at the highest.

According to this, any tuberculous subject who shows 37° C. (98.6° F.) regularly in the evening should be considered subfebrile. If he shows regularly a temperature above 37° he is to be considered a vesperal febrile case.

Any tuberculous subject who, while febrile in the evening, shows 37° in the morning should be considered permanently febrile.

As a rule, the rise of temperature in the tuberculous patient free of morning fever begins to appear at 1 or 2 o'clock in the afternoon. The time of maximum temperature is very variable, but in the majority of instances is between 5 and 7 o'clock.

The preceding should be taken merely as general statements, for there are many exceptions. The physician in charge should be familiar with the fact that some tuberculous subjects do not show their decline in temperature at the usual time; that others reach the maximum at 2 or 3 o'clock in the afternoon, etc.

He should also remember that the process of gastric digestion is often accompanied in tuberculous subjects by a rise of body temperature. As a rule, any thermometric

reading made before 5 P.M. or after supper should be disregarded. Again, it should be borne in mind that a severe coughing spell may induce a marked rise of temperature, which, however, soon passes off.

As a routine, the tuberculous patient should take his temperature twice daily, between 7 and 8 in the morning and between 5 and 6 in the afternoon.

On the basis of the above general features of the fever in tuberculosis, physical exercise may be regulated as follows:

(1) Patients entirely afebrile may walk at any hour of the day, the amount and severity of the walk being, however, under the control of the physician, who is aided in his decisions by the thermometric and weight-scale readings.

If, even with carefully regulated walks, the thermometer shows an evening rise; or, even in the absence of such a rise, if the next time the patient is weighed a loss in weight is found to have occurred, and such a loss cannot be plausibly accounted for otherwise, the conclusion must be that the exercise taken was excessive and should be at once reduced.

(2) The patient who is febrile or subfebrile only in the afternoon and evening should do most of his walking in the morning, before the midday meal. Here again, the exercise taken should be regulated as to amount and severity by the physician, and the results checked by means of the thermometer and scales. If, when taking a morning walk, the tuberculous patient has no more evening temperature than before, and provided he eats well and his weight shows an increase, he may be allowed to take another walk, either just after the midday meal or between 4 and 5 o'clock in the afternoon.

It is quite unnecessary to keep in bed a patient whose temperature falls to 37° C. or below in the morning, whatever his temperature may be in the evening, *e.g.*, 39° or 39.5° C. (102.2° or 103.1° F.). It is much better for him to be on his reclining chair on the veranda, and his fever will descend much more rapidly than it would in his room.

If, perchance, some evening about 6 o'clock he feels more tired than usual, he will simply have to go to bed before supper.

Thus, it may be put down as a general rule that, anent fever in tuberculosis, it is not the evening temperature that regulates whether the patient is to remain in bed, but the morning temperature.

Some physicians in charge of sanatoriums do not follow this rule, but ever since I began to apply it, twenty-five years ago, I have seen nothing but good results, and have never ceased recommending it.

*B.* The physician often meets with a puzzling type of thermometric curve in tuberculosis. The most important vagary from the clinician's standpoint, because it is the most frequent, may be described thus: A tuberculous patient with more or less seriously diseased lungs, but who is ambulant, subfebrile or febrile in the evening, no longer has the same oral, axillary, or rectal temperature as he had while recumbent, within ten or even five minutes after he has risen from recumbency to the standing posture. To this phenomenon the terms *clinostatic* temperature and *orthostatic* temperature have been appropriately applied.

This phenomenon, indeed, occurs in several forms.

One patient, for example, has an oral temperature of 38° C. every evening. Every morning, while in bed, after having passed a highly satisfactory night, he still shows, a full quarter hour after awakening, a temperature of 37.5°

or even 38° C. He remains in bed for a half hour or even an hour, takes his temperature again, and finds it still high. He gets up, takes his temperature after having been in the standing position for ten minutes or even less, and now obtains a reading of but 36.5° or 36.8° C., which is really his morning temperature, as may be demonstrated by having him regularly rise early.

This condition may persist for weeks and even months, as long, in fact, as the pulmonary lesions maintain the evening temperature of 38° C. Gradually the patient improves and one fine morning, even while he remains in bed, his temperature stays at 37° C. or even lower, without anything special being apparent to account for this change.

The following is another equally interesting variation:

A subfebrile patient whose temperature is ranging from 36.9° to 37.1° C. (98.42° to 98.78° F.) in the evening shows every morning, in bed, a reasonable time after having awaked, 37.3° or 37.5° C. (99.14° or 99.5° F.). He uses the thermometer again two or three times, with identical results. He now gets up, and after having stood for five or ten minutes, his temperature is but 36.6° C. (97.88° F.) or even less.

As in the preceding case, this condition may persist for weeks or months, up to the time when, his health having improved in all respects, the usual curve reappears, *e.g.*, 36.5° C. (97.7° F.) in the morning and 36.8° C. (98.24° F.) in the evening.

In the first type, this thermometric vagary is rather deceptive, for in the case of patients showing rather pronounced evening rises of temperature, the elevations may cause the physician to think that the fever is permanent and lead him, quite naturally, to order complete rest for a patient who might, on the contrary, derive distinct advan-

tage from getting about a little in the morning, during his afebrile period—provided other medical reasons did not contraindicate such moderate indulgence in exercise. Indeed, if there be one thing that I have become thoroughly convinced of since I began to have charge of tuberculous patients over twenty years ago, it is the uselessness of immobilizing in bed patients who are afebrile or almost afebrile in the morning, even if they have pronounced fever in the evening—unless, I repeat, other definite reasons exist for imposing absolute rest. I have never had occasion to feel that I had done wrong in following this rule; indeed, many times I have seen this mobilization of the patient in the morning alone, or for a greater portion of the day, in conjunction with the rest treatment on the veranda, bring about unexpected, rapid improvement in patients who had not been doing well in bed.

Whether tuberculous patients are as yet showing only their primary apical lesions, with or without surrounding congestion; whether they are passing through a secondary pneumonic or pleuropneumonic attack; or whether they have just experienced some form of complication, there is one period at which they must be gotten out of bed in spite of persistent febrile exacerbation in the evening, simply because their system has need of a certain amount of that physiologic activity which presides over a more or less normal life of the tissues, *i.e.*, which regulates metabolism.

Encountering the second variety above referred to, the physician might believe the case to be one of reversed tuberculous fever, *i.e.*, one with a vesperal minimum temperature. Now, this particular type of fever bears rather an ill repute, which, as a general rule, I believe to be justified. But usually it is of prognostic significance only in the grave and severely febrile cases, which have nothing in

common with the ambulant tuberculous patients we are here considering. Consequently, the mere fact that a patient with an evening subfebrile temperature shows a higher temperature in the morning while in bed than he does in the evening while in the standing posture should lead one to suspect a clinostatic temperature and, while keeping the somewhat unusual curve under observation, there is no occasion to be apprehensive concerning it.

This same thermometric paradox may be observed among patients reclining on chairs during the daytime.

Among the relatively few patients for whom we order rest treatment on the veranda during the morning, some may be noted who, after having gotten awake, up, and dressed in perfect condition, eat their breakfast, take a short walk, and repair to the veranda to recline in the open air. They have hardly been an hour or an hour and a half in their chairs when, happening to take their temperature, they find it to be 37.8° or 38.2° C. (100.04° or 100.76° F.), in the absence of any other manifestation of fever. They rise from their chairs, walk about for five minutes, test their temperature again, and find that it has dropped to 37° C. (98.6° F.).

Such an occurrence is even commoner in the evening.

For instance: A patient has been in his chair since 4.30 P.M. At 5.30 he takes his temperature and finds it to be 38° or 38.5° C. (100.4° or 101.3° F.). He wonders at this, as he is experiencing no febrile discomfort. He gets up, remains standing for five minutes, uses the thermometer again, and finds his temperature to be only 36.8° or 37° C. (98.24° or 98.6° F.).

This peculiar state of affairs may be only temporary in a given patient, being present a few days, then disappearing, without anything special being noted to account for it.

Some tuberculous cases however show a carcinomatous. They seem to be intolerant of rest in the recumbent position, at least in the daytime.

This intolerance is generally not primary. Thus, when they are febrile and are actually bed patients, they are admirably tolerant of the chair; but as soon as they are better and have become afebrile or nearly afebrile they become quite intolerant of it. They have hardly been settled in the chair for an hour, or even less, before they experience a congested feeling and an imperative need of getting up from it. The phenomenon shows itself in a rise of temperature, which drops down again within a few minutes after they have stood up. Indeed, in some instances, were insistence to be made upon the patients remaining at rest under these conditions, they would be observed to become nervous, restless, and at times even pass into a state of actual distress.

These are matters of daily observation, and as such are doubtless worth being familiar with. But as for the mode of production of these phenomena, that is a different story, and for the time being it seems rather obscure.

In the first place, the rise of temperature, maintained by the patient's staying in bed and brought on by reclining in the chair in the daytime, is not actually fever. It is temperature; it is a thermometric manifestation, that is all. It seems to be comparable with some at least of the peculiar thermometric phenomena formerly termed nervous or hysterical fever, so frequently observed among certain neurotics of either sex.

The fact is that these calorific manifestations are never accompanied by the usual malaise of fever. In the majority of instances they are practically detectable only with the aid of the thermometer, and when the patient is actually

conscious of the disturbance he experiences chiefly a sensation of congestion, of steaming of the face, and of heat in the ears; when, finally, he has experienced the sensation several times and has, as it were, become educated in regard to it, he may get to feeling a little depressed, perhaps simply from the thought that the thermometer is going to show an unusual rise of temperature.

When one examines more closely the subjects most apt to exhibit this thermometric phenomenon, it is easily noted that they generally belong to that group among the tuberculous which I have termed the *angioneurotics.* These patients show more or less acrocyanosis, glove-like in distribution, with some degree of hyperidrosis; they exhibit erythrodermia, show marked permanent congestion of the pharynx, together with a marked tendency toward congestion of their faces, lips, and ears, and possess hearts readily subject to nervous disturbances. Since this angioneurotic state in some tuberculous patients appears to me to be essentially a circulatory defect, mainly of neuropathic origin, one need not be surprised at the fact that the patients presenting orthostatic and clinostatic temperatures are nervous.

In support of this view I may state that angioneurosis and temperature anomalies among the tuberculous run a parallel course, *i.e.,* that patients who cease to show the latter phenomena are patients who are recovering and who, consequently, improve in respect of their angioneurosis, as I have pointed out elsewhere.

This represents about all that we know concerning the significance of these peculiar temperature phenomena among the tuberculous. Is not the angioneurotic state that seems to be associated with them itself a congenital circulatory, or better, neurocirculatory defect, later accentuated or even enhanced tenfold by the tuberculous process? Is it brought

on and maintained by one or more endocrinic disturbances? So far, therapeutic attempts have hardly supplied any evidence in support of the latter supposition.

Aside from these thermometric phenomena manifestly related to the recumbent and standing postures and observable for weeks and months in some tuberculous patients, one may also meet in such patients with other peculiarities of temperature which I have already described elsewhere and which, in my estimation, should not be confounded with those already mentioned.

(1) Some tuberculous patients, more or less febrile in the evening, showing, *e.g.*, 38° or 38.5° C. (100.4° or 101.3° F.) at this time, exhibit while in bed in the morning, a quarter of an hour after waking up, for instance, a temperature of 37.5° or 37.8° C. (99.5° or 100.04° F.) for a more or less prolonged period. When, however, *without rising from bed,* they take their temperature again half an hour later, they find it to be only 36.6° or 36.9° C. (97.88° or 98.42° F.)—their true morning temperature.

(2) Some patients, having taken in the evening an ordinary dose of a hypnotic or merely a calmative drug, find their temperature next morning to be much higher than on other days.

(3) In others, the temperature upon waking remains high if they have had an unusual night's sleep, whether this sleep has been unusually profound and "like a log" or whether, on the contrary, they have spent an unsatisfactory night, with relative insomnia or restlessness.

(4) I have also called attention to the fact that certain tuberculous patients, when convalescing from some form of intercurrent attack which has kept them in bed for a few days, continue to have, upon awaking and even through the entire morning, an unusual, unduly high temperature, such

as 37.5° or 37.8° C. (99.5° or 100.04° F.), although for several days previously the temperature had descended to this same level in the evening; and that simply disregarding the indication and having these patients get up is sufficient to restore the previous morning temperature, such as 36.8° C. (98.24° F.).

(5) Finally, there occurs a form of disturbance in which the temperature falls because of overwork on the part of the patient; this condition I described about fifteen years ago in the course of a discussion of the question of febrile reactions due to overwork in tuberculosis.

It has seemed advantageous, after mentioning the orthostatic and clinostatic temperatures, to point out the various foregoing thermometric modalities, as they always constitute somewhat of a surprise and it is well for the physician called upon to supervise the treatment of a tuberculous patient to bear them in mind. Not only may his patient thus derive benefit, but it will obviate the physician's finding himself at a loss when confronted with one of these peculiar vagaries of temperature.

*C.* A patient with continuous fever must be practically condemned to complete rest. If he shows a temperature of less than 37.5° C. (99.5° F.) in the morning, the physician feels morally obliged to grant him a short walk before lunch, but any sort of prolonged exercise increases the evening fever and tends to make this fever continuous.

It should be noted that by a *walk* is meant an actual, sustained tramp and not the slight, repeated displacements connected with various minor activities which present themselves throughout the day.

In all that has been mentioned so far, the act of walking was principally dealt with. Indeed, among the tuberculous, exercise should be taken mainly with the lower limbs.

All more or less forcible exertions or sudden movements of the upper extremities should be interdicted. The arms are located too near to the lungs and react too strongly upon the thorax and its pleural lining. Calisthenic exercises, fencing, etc., must be abstained from.

Many times hemoptysis has been observed in tuberculous patients who have indulged in exercise of this or similar types. One such patient threw snowballs all day; another played a long game of billiards; another drove a team and, while exerting himself to hold in the horses, had a hemorrhage; another danced the whole evening, etc.

Coincidences should, of course, be given due credit. But a cause and effect relationship is so commonly observed that it is necessary for the physician to disallow all forms of violent exercise. If the patient fails to heed the warning, at least he will have no one to blame but himself.

Walking, like the rest treatment, must be regulated by the physician. The patient must not be simply turned loose on the highroad and allowed to tramp about at his own discretion. To those who are capable of undertaking actual long walks, and not simply five- or ten- minute strolls around the garden, the following mode of procedure is to be recommended.

The patients should walk slowly, conversing as little as possible, generally without keeping any definite destination in view, but stopping the outward journey as soon as their watch shows that they must turn back in order to reach home at the hour previously decided upon, *i.e.*, in order not to prolong the walk beyond the total period allowed.

In hilly districts the ascent should be undertaken on the outward journey, in order to reduce the amount of fatigue when returning.

Patients taking walks should not take prolonged rests, standing in one spot for a long time or sitting or lying on the ground, either in the shade or in the sun.

They should wear relatively light clothing, carrying a rather light cloak on the arm in case of need and should preferably go bareheaded, using a parasol, however, if the sun is at all bright.

Upon returning home they should not take off their wraps, but rather put on more clothing. They must never sit down at once upon their reclining chairs or any other chairs, but should rather remain standing and move about a little for a while in order to allow the activation of the circulation induced by the walk to subside gradually. As it is sometimes put, their "blood has been set moving," and this process should not be too suddenly arrested.

When they are overheated upon reaching home—and too often they are not aware of it in the winter time—there is all the more reason for not removing their wraps. If, furthermore, their underclothing is moist, or they are in an actual sweat, they should preferably permit the garments to dry upon their backs, meanwhile moving about and even walking a little, rather than change their underclothing. Indeed, to my mind, when an ambulant tuberculous patient changes his underclothing because he has gotten into a perspiration in walking, just as in the case of patient who sweats to a moderate degree at night, he annuls a defensive action on the part of the skin which had better, instead, be induced and maintained.

In the light of what has already been said concerning different countries and climates, these brief or more prolonged morning walks, often covering eight or ten kilometers, always constitute, when adapted to the needs of the individual patient, a manifestly useful form of physiological

exercise, necessary at first for maintaining physical equilibrium and gradually assuming the nature of a definite physical training or hardening process which, never pushed to the point of overtaxing the patient, has for its purpose to increase his powers of resistance to noxious influences, both internal and external, and ultimately his immunity against tubercle bacillus infection.

Again, just as they carry out the rest treatment out of doors in all kinds of weather, ambulant tuberculous patients must take their morning walks regardless of weather conditions—except on rare occasions when an actual, severe storm is raging. The essential point is that they must be properly clad and shod.

During nine months of the year it makes little difference at what time in the morning the walk is taken. In the hot season, however, it is strongly advisable to leave the house, as well as to return, early; the patient can then rest for a time upon his reclining chair with advantage before the midday meal.

In what proportion should rest and exercise be ordered, either in the case of the individual patient or in that of groups of patients? After the earlier authorities, Brehmer and Dettweiler, specialists in tuberculosis therapeutics, undertook to readjust the mode of application of the fresh air and rest treatment according to their personal experiences and, in a few instances, on arbitrary, theoretical grounds. Some, adhering strictly to the German plan, insist upon a rather high, minimum number of hours of rest out-of-doors on the reclining chair, aside from the time set apart for meals and a few short recreation periods. Others allow their patients much latitude, though recommending certain hours for rest on the reclining chair, but without

insisting very strongly upon their observance. All claim that their respective plans yield good results.

After having personally tried out for about thirty years the fresh air and rest treatment in its various forms and general applications, special attention being paid to the data supplied by the patients themselves, I have long since been able to fix upon a suitable average rest period during the daily routine—an average period which seemingly meets the requirements of the body, is applicable without forcing to all ambulant tuberculous patients, is readily accepted by all, gives uniform satisfaction, and which, moreover, leaves the door open for prolongation of the average period if any need for it arises.

Following is our daily plan of action:

(1) Patient rises at 7.30 A.M.

(2) Breakfast from 8 to 9 A.M., in the common dining-room.

(3) From 9 A.M. to noon, complete freedom, in a general way, to take a long walk if desired, to write letters, etc. Those who prefer may rest on the reclining chair for any such portion of the time as may seem advantageous. Strict rest is imposed on those patients, generally few in number, for whom rest treatment on the veranda has been prescribed.

(4) Noon. Lunch, followed by a period of recreation.

(5) 1.30 P.M. Rest period termed "the siesta," obligatory upon all patients until 4 P.M. Patients must neither converse, play games, nor make any noise; many of them take good naps during this period.

(6) 4 P.M. "Tea" in the common dining-room, followed by a recreation period.

(7) 4.45 P.M. Compulsory rest treatment, though with less rigid restriction as to conversing, until 6.45 P.M.

(8) 7 P.M. Supper, followed by a recreation period.

(9) 8.30 to 9.30 P.M. Rest treatment, followed by retirement to bed.

According to this plan few patients are definitely ordered to rest before noon. Instead, the morning hours are set apart for the most active exercise of the day, and for letter writing and other tasks, in accordance with the unquestionable principle that fever in the tuberculous patient is influenced most markedly by all forms of activity indulged in after noon. Only exceptionally and for important reasons should lengthy walks or other trips be permitted in the afternoon.

*D.* In late years considerable discussion has developed as to whether there is any advantage in having tuberculous subjects work, especially those undergoing the customary course of treatment in a sanatorium. Hippocrates, as of yore, gives an affirmative answer, while Galen replies in the negative. Under such conditions of uncertainty, it is well that the public should be enlightened on the subject.

The question is by no means a newly propounded one. Without undertaking to present an actual history of the matter, it may be stated briefly that ever since the time Brehmer, of Görbersdorf, and Dettweiler, of Falkenstein, as a result of their personal experience, respectively instituted a systematic exercise cure, intelligently regulated, and a rather strict rest cure, the problem has been brought up time and again. And every time a therapeutist has attempted to solve it by laying down a definite conclusion in one direction or the other, a medical blunder has been committed, to the great detriment of the poor consumptives.

The succession of events has been about the same as in the case of ordinary feeding and overfeeding. For about fifteen years, after certain most excellent experiments on

dogs had been made and recorded, all consumptives seeking medical advice were subjected to overfeeding on general principles, and it took a number of years to find out the fact that a considerable number of patients were thus being kept from recovering who would have fared quite well had they been allowed to eat like an average person, or even less. At the present time, fortunately, physicians are familiar with the disastrous results following overfeeding of the tuberculous; although the public, independently of all medical advice, is still addicted to the practice through former training, acquired momentum, and mental contagion.

Reverting to the question of work for the tuberculous, the following facts are to be noted:

As has just been pointed out, offering a definite answer to this question, either in the affirmative or the negative, would constitute an egregious medical error. In my estimation, the only way to decide intelligently whether it is feasible to have these patients work is to hark back to conditions as they are in everyday life and to consider the facts as they are manifest to every one. By proceeding thus, highly serviceable indications may be secured.

What then are the circumstances under which tuberculous individuals ordinarily live?

Every practitioner is acquainted with a number of persons, single or married, who, while actually cases of tuberculosis that have remained unrecognized for years, always free of fever, or febrile only temporarily by reason of prolonged winter colds or so-called "grip" in the spring season, are constantly up and active, going about their business, eat well, drink well, and even lead a rather gay life, and are generally considered simply as being short-winded or suffering from catarrh, emphysema, or arthritic lung trouble, and

are thus enabled to expectorate blood without becoming alarmed about it or causing apprehension in their families. As heads of families, expectorating anywhere without taking precautions of any kind, they unwittingly become foci of infection and may with justification be accused of causing their wives and children to pass out of existence one after the other, while they themselves live on stout-heartedly for an indefinite period. One thus meets with men who have buried three or even four wives, and women who have infected with tuberculosis two or three husbands in succession.

The practitioner is also acquainted with persons who, although admittedly tuberculous for ten or fifteen years, simply remain tuberculous, working hard, eating well, and following certain wholesome precautions according to their physician's counsel.

Again, he knows of tuberculous subjects who, almost moribund because they had nothing to eat, began to recover from the day they secured work that enabled them to nourish themselves well, and ultimately were restored to excellent health although they had continued to work throughout their illness.

Well and good! But these exceptions, frequent as they may be, show simply that either because their tubercle bacilli are of a very mild pathogenic strain, or because of natural resisting power on the part of their bodies, some individuals are able to harbor a tuberculous lesion for years as a local parasite, without being otherwise inconvenienced, without even being infected by it, provided they can eat properly to maintain life. They are like the old trees bearing various sorts of lichens, which live attached to the bark without in any way impairing their vitality.

Among these individuals, moreover, are actually some with lung cavities and with rather abundant suppuration!

But even aside from these how many are to be seen—certainly about 90 per cent.—who, from the onset of the disease, aware or unaware of its presence, experience setbacks through physical overstrain which push them headlong to final dissolution unless matters are quickly readjusted.

What else is the preliminary hemoptysis, indeed, that abrupt warning symptom, but a peritubercùlous hyperemia with hemorrhage due to "fatigue" in the broadest sense of the word?

What is the continuous or even merely vesperal fever of "minor phthisics," whereby the disease lesions are kept up, develop, and progress, but a fever from overstrain, superadded to the mild febrile condition which the early tuberculous process may *per se* induce?

What is the high fever of tuberculous subjects leading an active life, which drops from an evening temperature of 39° C. (102.2° F.) to 37.5° C. (99.5° F.) after three or four days of rest, but the ultimate manifestation of fever from overstrain?

What is the bronchial embolism of the tuberculous, which leads first of all to a bacillary infarct, then to a destructive pneumonia, and finally to a cavity in at least one half of all patients previously harboring only slight lesions, but a result of overstrain, since the fact seems definitely established that these bronchial embolisms occur, in at least nine-tenths of all instances, among persons who refuse to give themselves rest, who *force* their pulmonary lesions as it were?

What are all those complications of the nature of a dry, membranous pleurisy with serous infiltration, or of

pleurisy with actual effusion, which give stern notice of a previously overlooked mild tuberculous process or which suddenly set in in admittedly tuberculous subjects leading an active life, if not "mobilizations" of tubercle bacillus colonies, the result of fatigue and exhaustion of the system?

What are those mild or severe manifestations involving the pulmonary or hepatic circulation in tuberculous subjects with defective hearts—those alarming attacks that I have taken the liberty of terming *phthisicardiac accidents,* which may yield in forty-eight hours to energetic measures but may otherwise carry off the patient in a few days—if not attacks due to overstrain.

What is the so-called *traumatic hemoptysis,* common in tuberculous patients in all stages of the disease who indulge in various forms of exercise involving their chest and arms —billiard players, huntsmen, singers, musicians, laborers, etc.—if not a result of localized fatigue or of actual tissue disruption due to overstrenuous work?

The above conditions mark the usual fate of tuberculous subjects who refuse to take a complete rest or who continue to carry on a portion of their work. These are matters of common observation.

May it be said that these various disturbances do not occur in patients undergoing the rest treatment? By no means. Such patients assuredly do develop bronchial embolism, at times even pneumonic infarcts; more often, perhaps, pleurisy than actual pneumonia; they exhibit hemoptysis from various causes, either as a cleaning out process, through spontaneous rupture of vessels, from menstrual congestion, from unusual exercise, or from dietary error. When well treated, they rarely develop hemoptysis of alimentary origin, and it is a fact that to the latter cause must be ascribed three-fourths of all instances of spontaneous

blood expectoration, aside from menstrual hemoptysis. What patients undergoing rest treatment do *not* develop, however, is hemoptysis from overwork.

On the whole, among tuberculous patients at rest, all these complicating manifestations are brought down to an irreducible minimum.

In brief, tuberculous subjects who fail to take systematic rest develop with the highest degree of frequency all possible accidents resulting from tuberculosis, while in those who rest these complications are reduced to a minimum. Hence the stringent conclusion which appears necessary, *viz.*, that tuberculous patients must be forbidden to work and lead an active life, and must be ordered to rest.

This rule, however, is not an absolute one, and were it applied unreservedly, one would be exposed to committing medical errors in various directions.

The fact having been established that certain tuberculous subjects are able to dispense with systematic rest and even to perform work, by what earmarks are these particular subjects to be known, if indeed, they can be recognized at all?

Here is a difficult question to answer. Two lines of inquiry appear, however, to afford some assistance in this connection.

The first is related, on the one hand, to what may be termed the malignancy of the tubercle bacillus in the individual case, and on the other, to the degree of receptivity of the patient's system to the poisonous effects of the tubercle toxins. It consists in the thermal instability of the system, provided the fact has been proven that such instability is not merely the result of a neuropathic state. It seems unquestionable that tuberculous subjects who remain afebrile, whatever be their existing pulmonary tuber-

culous condition, may indulge in various forms of exercise and even work without their vesperal or diurnal temperature being appreciably influenced by it. Thus, they are protected from overwork fever, which opens the door to the various complicating phenomena mentioned. Provided they eat well and their work, of course, be not pushed to excess, these individuals continue to live, like the trees already referred to, victoriously holding in subjection their lichens or parasites—in a word, their local tuberculous lesions, in the true sense of the term—as though they harbored merely a sluggish skin lupus.

The second line of inquiry relates essentially to the condition of the individual himself, *viz.*, the systemic defects he may present apart from the tuberculous process. These defects could not all be discussed here; nor could it be undertaken to state whether each of these defects should or should not lead to interdiction of work in tuberculous subjects exhibiting them. These are, in fact, newly propounded problems which have hardly been studied as yet.

One group of defects, however, does seem to me to afford serviceable indications in this connection, *viz.*, that of the cardiovascular disorders.

Tuberculous subjects with defective hearts—in four-fifths of all instances cases of mitral disease, perhaps due to activity of the tubercle bacillus during the developmental and formative period, with or without that peculiar condition of the general circulation which groups them together under the term *congestive subjects*—are individuals unusually susceptible to all kinds of intoxications, whether from within or from without. The patients so markedly predisposed to alimentary intoxication that they develop hemoptysis merely from having eaten a little meat or taken a little wine for a week, almost invariably belong to this

group. As a rule, they are no less susceptible to the toxins of the tubercle bacillus than to the other forms of intoxication.

Nearly always these patients exhibit instability of body temperature, and their system is sensitive to all influences. Accordingly, with few exceptions, their circulatory weakness must be held as contraindicating all work. Otherwise, manifestations due to overwork soon begin to appear, all the tissues become impregnated with poisonous material and the wastes from faulty combustion, and within a short time their emunctory functions yield to the point of threatening life unless they are ordered to rest. So much for what appears to me to have been definitely demonstrated thus far. I do not claim, however, that there are no exceptions to these varieties of rules, for in tuberculosis and among tuberculous subjects almost anything may happen.

On the basis of the above considerations, the physician called upon to decide whether such and such a patient may work, even after he has thoroughly examined into the case and weighed the pros and cons, will do well to be rather guarded in his expressions—as is entirely justifiable under such circumstances. While setting forth the probabilities favoring permission to work, he should give such permission only with the reservation that he may be led to change his views after actual test in the individual subject. No shame attends the statement that one may prove to have been mistaken in his forecast, in view of the insecure premises upon which his decision has necessarily had to be based.

On the whole, the proportion of tuberculous subjects able to perform work without distinct prejudice to their health constitutes only a small minority, and in a general way, it is quite difficult to assert definitely that such and

such a patient is in a condition to work, even under the most favorable hygienic conditions that can be demanded of him.

All this accounts for the relative failure of all attempts to erect popular institutions having for their highly praiseworthy purpose to restore to tuberculous subjects improved by a few months of sanatorium treatment the amount of work and compensation lost by reason of their illness. Indeed, aside from the fact that the majority of them were unable to work, the remainder returned to their occupations under the same faulty conditions as had already been factors in the original onset of tuberculosis.

Should all tuberculous subjects, then, be placed under absolute rest treatment?

While the great majority of cases of pulmonary tuberculosis require a rest cure, this does not mean that all patients must be doomed to almost complete immobility. Such a practice would constitute a mistake in the opposite direction. The rest treatment is a form of medication that must be dispensed in greater or less amount, according to the requirements of the individual case. I need not here present a list of these indications; physicians are well conversant with them, as they have already been well established for a long time.

It is well to note, however, that there exists a group of tuberculous patients whose systems do not withstand prolonged rest. This group includes both cases that have never been frankly febrile and cases that have gotten rid of their fever. In general, these are the patients who exhibit a neurotic tendency.

After reclining a few hours on their steamer chairs, they become unable to keep still, get restless, show an excited facial expression and if they, nevertheless, remain in their

chairs, their temperature exhibits an evening rise without any other known cause. They may even lose their appetite and suffer from insomnia.

Manifestly, such patients as these need to move about, and even if their lung condition demands a rather protracted rest cure, one is compelled to allow them to interrupt it at frequent intervals with a little exercise. It is an actual fact that their temperature returns to its customary level and all their nervous discomforts pass off as soon as they have been permitted the amount of physical activity indispensable to proper systemic equilibrium.

Now suppose the case is one of that rather peculiar type in which the complete rest cure is poorly borne from the start, or indeed, that the question of exercise comes up in respect of any tuberculous case in which the time seems to the physician to be at hand for prescribing a physiologically advantageous form of work; what form of activity shall he recommend?

Shall he order his patients suffering from thoracic disease to saw wood, break stones, hoe the soil, plough, or practice fencing?

In truth, there are all kinds of work and above all, some activities constitute work and others, exercise. Since it is unwise to formulate generalizations on the basis of exceptional cases, much the best plan is to group the forms of work just mentioned, together with other similar varieties, as being uniformly dangerous for the great majority of tuberculous patients, and to interdict them as such.

The best form of work, or rather the best form of physical exercise, which is appropriate for all tuberculous cases, is walking. This is truly the only mode of using the muscles that exerts a favorable effect. It is sufficient from the physiological standpoint, for it brings into action espe-

cially the lower extremities, which do not, like the arms, exert a direct and often harmful effect upon the chest, while also requiring activity on the part of the respiratory apparatus.

The beneficial effects of walking, in tuberculous subjects able to take exercise, are commonly recognized and have been known since the earliest ages of medicine. There is really no occasion for seeking a better type of exercise among different sorts of work which, while undoubtedly affording greater variety, are much more dangerous.

Locomotion, like the rest treatment, should be regulated by the physician in accordance with the capacity and needs of the individual patient, not only in respect of the time to be spent in walking and the intervals at which it may be indulged in, but also as regards the type of ground to be covered.

This constitutes the really useful form of activity for the tuberculous patient who can take exercise. A patient able to indulge in an 8 or 10 kilometer (5 or 6 mile) walk in the morning to advantage, might, on the other hand, find it highly detrimental, *e.g.*, to saw wood even for fifteen minutes.

### III. The Dietetic Treatment.

**Necessity of an Ample Diet.**—The tuberculous patient should ingest a great deal of food. This is a measure complementary to the fresh air and rest treatments. As we have already seen, both of the latter methods have for their purpose, among other aims, to enhance the appetite.

If, notwithstanding, a long time is required for the appetite to return, the patient should nevertheless endeavor to take in as much nourishment as possible.

Undeniably this is the most difficult item in the hygienic treatment of tuberculosis.

Many patients suffer from gastric disturbances due to a variety of causes before their lung trouble comes on. A majority of them experience an almost complete aversion to all known articles of food. When these patients are told that they must get accustomed to eating more than they did while in health, they look upon the physician as asking the impossible. And yet, this aim must be attained.

Many tuberculous patients develop an enormous appetite after a week or two of fresh air and rest treatment. They could eat from morning till night. Of course, there is no trouble with these at all. But what a desperate struggle must be waged in the other cases!

These patients must be convinced that the old adage to the effect that the appetite grows as one eats, was formulated for their own special benefit. As a matter of fact, it *is* thoroughly applicable to many patients who, though enjoying fair digestive capacity, have lost the habit of eating. They lack appetite through general weakness, through diminished power of assimilation, and also because they have become too "fussy" from being continually pampered by their families. As long as they are capable of assimilating they should be made to eat, even at the risk of their losing a few meals by regurgitation; little by little, as their tissues become better nourished, they will be seen to take food like every one else. Their lost appetite will be restored.

In illustration of the above statements, the following rather striking anecdote may be related. A patient with a well localized tuberculous lesion, exhibiting fever both morning and evening, and who had already been following the open air treatment for a considerable time but was rather sceptical as to the benefit to be obtained from it, found him-

self rapidly losing ground. His appetite was *nil,* and food was regurgitated regularly. One day I took, perhaps, a little more pains than usual to explain to him the rapid downward path upon which he was travelling. At all events, being essentially a strong-willed person and at last completely convinced that it was high time to take radical action, he began to take in food in reckless fashion. For two weeks at least, he was seen to leave the table at each meal to dispose of all the food he had already taken. A few moments later he would reappear, his meal was served to him over again from A to Z, and most of the time he retained it. A month later he was eating like every one else, his fever was subsiding and he was visibly taking on weight.

True, a stout heart is necessary to act in this fashion. But this is always required if one is to recover from tuberculosis. Persons with strong will power are always the first to obtain results.

**The Kinds of Food to be Taken.**—Too much importance is attached, in my estimation, to a chemical classification of foods. The tendency is to calculate in advance just how much protein, how much carbohydrate a day, etc., is required for the tuberculous patient to feed himself and maintain perfect nutritive balance.

Practice, unfortunately, often demonstrates the fallacy of these theoretical principles.

The fact is that tuberculous subjects may be divided, in this connection, into two main classes.

The first, and happily the larger class, comprises those who have been kept from eating by poor hygiene alone, and whose digestive functions and appetite are more or less completely restored as soon as they are brought under the open air and rest treatment and have placed themselves in

the physician's hands. These might be termed the normal candidates for dietetic treatment. Whether they have no fever or are febrile makes little or no difference. From the outset, the physician in charge deems them capable of making proper headway under treatment.

The second class consists of those with more pronounced digestive disturbances, with atonic or dilated stomachs, with achylia rebellious to ordinary therapeutic measures; those with incorrigibly capricious tastes or with an aversion to all food, who, having been constantly pampered before their illness, "lived on air," have contracted tuberculosis and seem incapable even of putting forth the necessary effort to ingest food. These are the abnormal candidates for dietetic treatment.

Reference is not here made, of course, to the cases in pronounced cachexia doomed to early death, a few of whom are still ingesting food which serves little or no useful purpose, as they have nothing left of the physiological processes of assimilation.

In the majority of tuberculous cases, indeed, it is quite useless to formulate any special plan of feeding. A mistaken impression prevails among patients' families that, in order to help the patient recover, they must prepare for him various special dishes and gorge him with so-called substantial foods, such as juicy meats, etc. On such a diet, most tuberculous patients capable of taking food lose their appetite and the habit of eating. They spend their time at the table discussing and complaining of what they are given; they really think they are eating but, when all is said and done, take in but little food. A good family table, a little better humor on the part of all concerned, and better hygienic measures would be far more useful for them. It is bad for tuberculous patients to be unnecessarily pampered.

Those who are able to eat should take four meals a day. The breakfast should be the same as that taken by other members of the family—chocolate, coffee with milk, tea, cocoa, always with bread and butter; honey, if desired; one of the various forms of porridge or cereal now so much in use, or some thick soup. Eggs and meats are exceptional additions to the breakfast fare.

The noon meal should always include several dishes, so that the patient may always find suitable food in sufficient amount. Meats are an important factor, but the patient should be free to eat what he wants. Relishes, condiments, and salad are to be given due consideration, and the salad should be taken practically at each meal, to help the patient in taking the rest of the food. Wine vinegar of good quality constitutes one of the best forms of acid that can be taken into the stomach.

Vegetables of all kinds should form an important part of the meal. Several vegetables should always be provided, as individual tastes vary widely in relation to this type of food. Fortunately they can be prepared in a number of different ways, *e.g.*, boiled, in a purée, sauté in butter, or in the form of salads. The same applies to macaroni and kindred preparations, which constitute a most useful resource in patients with sensitive intestines. Adding to all this various side dishes, pastry, compotes, jellies, and fruits when in season, the tuberculous patient's midday meal may be said to correspond, on the whole, to a full table d'hôte dinner.

The afternoon meal at four or five o'clock, like the breakfast, may be left to the selection of the patient himself.

The supper fare should be equally as generous as that of the noon meal. Any variety of soup may form part of it. It should not be forgotten that cheese constitutes an

admirable ferment which is highly serviceable during the process of digestion.

**Beverages.**—These may be left to the taste of the individual patient, unless the physician observes any special indications. Milk, light wines, beer, or cider may be used.

One fact in this connection deserves to be noted, *viz.*, that among those who use wine as a table beverage, often if the wine is stopped and plain water substituted dyspeptic symptoms will disappear as if by magic. Patients who drink only water are benefited by doing so.

Personally, I almost never recommend milk as a table beverage. Few tuberculous patients who eat well can take it without being more or less inconvenienced. Excellent as it is when taken independently of the larger meals, it proves heavy and indigestible at these meals in patients who are eating heartily.

Coffee and liqueurs at the close of the noon meal are rarely to be recommended. These are altogether useless additions, and, indeed, in the majority of cases are harmful to these patients, whose pulse rate is already, as a rule, accelerated.

Whether a tuberculous patient is taking a regular, normal diet, or receives a special diet, he should be impressed with certain definite principles in relation to eating.

To eat does not mean to gorge oneself with food.

The stomach, as accommodating an organ as it is, was not designed for receiving food in a completely unprepared condition.

The mouth, teeth, and salivary glands are indispensable to it as organs of preliminary preparation.

Most foods require to be chewed and at the same time thoroughly moistened with saliva before they are in a proper condition for gastric digestion.

The human subject is provided at each meal with an amount of saliva sufficient to moisten all he eats and facilitate its deglutition without the need of any other fluid. Man is practically the only animal that drinks while eating. While his ancestral tendencies may have so influenced him that he can hardly dispense with this habit, the tuberculous subject should at least reduce the amount of fluid taken at the table to such an extent that it will not interfere with his digestion.

To attain this purpose, however, the jaws must be sufficiently used, both to masticate the food and to induce salivary secretion. While the sight and odor of appetizing food may bring water to the mouth, the main agency in promoting a flow of saliva is nonetheless the act of mastication.

In the absence of mastication, there is no saliva. Poorly masticated and unmoistened food is swallowed with considerable difficulty and brings on a desire to take fluid with each mouthful, to help it down. Successive mouthfuls of water are taken, the glass is filled several times during the meal, and the following results occur:

The only partially masticated food, too bulky to be promptly attacked by the gastric juice, floats about in the excess of fluid. Gastric digestion is delayed and stagnation in the stomach follows. From this result rapid putrefaction, abnormal varieties of fermentation, spasm of the pylorus, and mechanical dilatation of the stomach, with its three chief symptoms: Sensations of weight, acidity, and splashing sounds.

Hence the tuberculous patient must masticate all food properly. It is well to caution him not to dip his bread into the vari[illegible]ffee, tea, or cocoa—that he takes [illegible]r. Bread thus soaked is

undoubtedly digested with greater difficulty because it is very easily swallowed with little or no mastication and generally without having undergone preliminary insalivation. The patient should eat his bread dry, whether with or without butter, should masticate it with the assistance of his saliva, and should take fluid only after these preparatory measures have been duly carried out.

The saliva supplied during mastication is in all likelihood one of the helpful factors in gastric digestion, and eating dry bread seems at times to act well as a laxative agency.

The above considerations are particularly applicable in the case of tuberculous patients because, by reason of their lack of appetite, they come to look upon eating as a difficult task, and are continually taking in fluid in order to be able to bolt the food which they have not masticated and, consequently, not moistened with saliva.

Some, for this reason, develop an actual mania for drinking fluid every minute, and at times it is a rather difficult matter to correct the habit, as these patients are nearly always more or less markedly neurotic.

**Aerophagia in Tuberculosis.**—Apart from the above patients, another class of cases is met with likewise neurotic, *viz.*, the cases with aerophagia, a condition rather frequent among the tuberculous.

As the term itself implies, aerophagia is characterized by the swallowing of air, which accumulates in the stomach and is generally expelled through the mouth by a species of eructation. Among the various forms of digestive disturbance so much complained of by consumptives, aerophagia holds an important place, as may readily be noted upon analysis of the discomforts and even pains which these patients refer to the stomach and bowels—not to

mention the less frequent disturbances of another nature. It may be put down as a positive fact that not one of these patients is in the least aware that he is suffering from aerophagia; hence their astonishment and tendency to skepticism when informed that all the symptoms they are reciting as evidences of abdominal or other disturbances arise fundamentally from the fact that they swallow air which distends their stomach.

The French clinicians who have carefully studied and established aerophagia as a definite morbid entity have, of course, described a number of different varieties, according to the special features that happen to have existed in the cases with which they had personal experience. The first form to be known and described was the major type of aerophagia met with in nervous, hysterical, and other subjects and constituting an actual neurosis. Later, the forms of aerophagia related to dyspeptic states were more particularly studied. It is highly probable that whether the patients be or be not sufferers from dyspepsia, the clinical manifestations of aerophagia constitute a continuous series of conditions ranging from the very mild to the very severe forms. A minor and a major form of aerophagia may be clinically distinguished.

Minor aerophagia, generally mild and easily mastered, is very commonly met with among the tuberculous, whereas the major form is only of exceptional occurrence among these patients.

Among persons in good health, aerophagia is practically a physiological condition. Many people swallow air while eating and drinking, and no less physiologically, either during the meal or shortly after, expel it again with an audible or inaudible eructation, promptly followed by an appreciable sense of relief in the stomach region. Indeed, not a few

persons think that repeated eructations after meals are a sign of good digestion. On the whole, aerophagia is thus practically a normal function, or a useful act at the disposal of the normal individual. Like many other physical acts, it may be cultivated, so that aerophagia and eructation at first become voluntary and later constitute an almost unconscious habit.

Why are so many aerophagics met with among tuberculous patients?

Obviously, many opportunities and reasons for ingesting air are afforded these cases. First of all, while eating and drinking. When they have no appetite, they dilly-dally at the table; they shift the food about many times in their mouths; swallowing becomes a nervous, automatic act with them; they often carry out the act without getting down any food, and in doing so swallow air rather than saliva, which is scanty. To wash the food down, however, they take many small mouthfuls of fluid, which bring about the same result, and whenever they take food with a spoon, *e.g.*, soups or semi-liquid articles, a fresh opportunity is afforded for swallowing a more or less large volume of air.

When they cough, whether by day or night, each act of coughing is likewise accompanied by ingestion of air.

So much for the milder variety of cases.

Aside from these, however, there are some patients in whom, for reasons connected with the disease itself, such as pharyngeal or pharyngo-laryngeal congestion, aerophagia is accompanied by sialorrhea. Their mouths being constantly burdened with stringy or frothy saliva, they eliminate some of it by expectoration, but are nevertheless continually swallowing it, along with air. This condition already borders on the habit or tic present in the severe aerophagics, for often these patients constitute a special

form of neuropaths, who eliminate saliva to the exterior owing to a constant fear or phobia of swallowing the discharges from their lungs, which they have learned to be a possible cause of intestinal tuberculosis.

Granting that a number of tuberculous subjects are, to a varying extent and in various modalities, aerophagic, why do they not act like normal persons who have merely to bring on an eructation in order to get rid of the air that has passed into their stomachs? Indeed, it is in this respect that these subjects are to be distinguished from all those exhibiting what may be termed "physiological aerophagia." To account for this difference it must be supposed that these patients, all having neurotic tendencies, have temporarily lost the power of eructation by reason of a process of inhibition similar to that which renders them unable to speak, for example, under many circumstances in the course of their lives as tuberculous individuals.

Among consumptives aerophagia is prejudicial in a number of respects. Among the principal and most striking disadvantages are a diminution or loss of appetite and an inability to take food. In addition, there are discomfort and sensations of weight and distention in the gastric region after meals; referred distress or pains, sometimes severe, in various points of the abdomen, base of the chest, or heart region, leading the patient to imagine the presence of a host of non-existent disturbances; vomiting, not very uncommon, and which gives little or no relief to the patient. All this may persist unchanged for a considerable time, but it may also awaken in the subject an unwholesome fear of taking food, due to apprehension of suffering during or after meals.

Sometimes the condition continues without interruption for months, but not infrequently one may observe in a

tuberculous case attacks of aerophagia lasting only a couple of weeks or even less; these simulate acute gastric or gastro-intestinal disturbances, and disappear after a time, only to reappear later.

Those who swallow but little air except while eating may come to the table willingly or gladly, but after having eaten the first dishes put before them they find it difficult, distressing, and at times even impossible to proceed any further, unless, as occasionally occurs, an eructation takes place and brings relief. In the absence of such an eructation they make an attempt to eat, drink all the more fluid, and often for several hours experience gastric discomfort, which is relieved only by regurgitation of gas—spontaneously or after ingestion of some appropriate remedy—or through passage of the gas into the intestine with the food. In the latter event, distressing sensations become shifted lower down in the abdomen, with pain referred always to certain points—very often to the hypochondriac regions, over the flexures of the colon. If, in addition, there occur paroxysmal contractions of the abdominal aorta or esophageal spasms, the unhappy patients come to believe themselves afflicted with a host of diseases they have heard about from various sources and which they describe to the physician with a mass of most extraordinary details.

This condition, in conjunction with the circumstance that vomiting is not infrequent, inevitably results in loss of weight and nervous exhaustion, together with a variable degree of hypochondria, which exert a highly detrimental effect in the treatment of the lung disease. Such patients are in comfort for only a few hours in the day and night, and finally, to avoid suffering, get in the habit of eating nothing at all, or practically nothing.

In the presence of such an aggregate of symptoms, it is not surprising that so many medical authors have described a condition which they term "dyspeptic aerophagia." As a matter of fact, while aerophagia does at times accompany some form or degree of gastric or gastrointestinal dyspepsia, generally the condition existing is merely a pseudo-dyspepsia. The proof of this is that, once the aerophagia has been diagnosed and removed by simple educative measures, the alleged dyspeptic condition disappears as if by magic, and the patient promptly begins to take food and digest it in a highly satisfactory manner—unless he is a true dyspeptic, either by reason of his tuberculous infection or from some other cause.

Besides there occur, however, many much milder cases of minor aerophagia, detection of which is of no less interest. These are the cases in which the patient complains merely of slow digestion, with some sensation of weight in the stomach, or of highly annoying borborygmi, sometimes with eructations at certain definite periods or with the ordinary "hot flashes," either during or soon after meals. Aerophagia should always be thought of in cases of this description. Once the condition has come to the physician's mind, the diagnosis can be made upon the most cursory inquiry, if the condition is indeed present. Patients seldom give a hint of the existence of aerophagia in the histories they themselves give. If, as is usually the case, they have already been to several physicians, they are much more likely to relate that they have been or are being treated for gaseous fermentation in the stomach and intestine—a condition actually seldom present, in my estimation, among the dyspeptic symptoms in our consumptive cases.

The patients who, with or without the above mentioned symptoms, exhibit sialorrhea and sialophagia are still more

deserving of sympathy, for their distress is continuous. They eat but little, eliminate considerable amounts of saliva which their subconscious or conscious phobia prevents them from swallowing voluntarily, and lose weight all the more rapidly.

The least serious form of aerophagia is that which accompanies coughing spells. This is a frequent variety. Often it gives but slight annoyance, for many patients, at the close of the coughing paroxysm, expel the air taken in by eructation and are in no wise further inconvenienced. Very few complain of the condition seriously, and where they do, it is probably because they have lost the power of voluntarily bringing on an eructation.

There is one clinical manifestation, however, which should attract the physician's attention and the presence of which should suggest the thought of aerophagia, lest an unfortunate error be made in the diagnosis and treatment of the case. Not a few tuberculous subjects, upon awakening and during the paroxysmal process of rapidly clearing out their secreting lung foci, swallow air in between their repeated acts of coughing. When the clearing out process has been practically completed they do not exhibit any eructations, and in fact, do not attempt to bring on any, being unaware of the source of the discomfort they experience. Instead, they continue to cough in order to expel what is causing the discomfort, and keep it up until gastric fluid or even a few mouthfuls of bile have been rejected; they are thus rendered unable to take their breakfast until eructations have occurred to bring relief or the gaseous accumulations have passed on through the pylorus.

Some consumptives swallow air both while eating and during coughing spells. As the accompanying discomforts are somewhat different, these patients consider themselves

doubly afflicted. If, after having made a diagnosis of alimentary aerophagia, the physician succeeds in almost or quite eliminating this disorder by educative treatment, the aerophagia associated with the coughing spells, frequently overlooked, persists and requires, in its turn, special verbal directions to the patient.

It should be noted that the mild form of aerophagia above mentioned occurs mainly before the tuberculous subject has placed himself under regular medical care. It is seen among new arrivals at the sanatorium, and is seldom observed to persist for any length of time after it has been diagnosed and treated in what appears, to me at least, to be a rational manner.

The patient should from the first be given to understand the nature of his difficulty, and have it carefully explained to him that it is not an organic digestive disorder or actual local disease of any kind, but merely a simple functional disturbance that can be easily corrected with a little voluntary assistance on his part.

If the aerophagia present is mainly of the alimentary type, he should be taught to masticate his food boli with the mouth closed; to drink, not in mouthfuls, but at a single stretch the quantity of fluid he wants to take; that while drinking he should be especially careful to *keep his upper lip immersed in the fluid,* and that while taking soup or any semifluid articles of food he should close his lips over the spoon when he has passed it into his mouth and not attempt to draw in air over the contents of the spoon. In general, it is well to reduce the fluid taken at the table to a very small amount, or even to nothing, if possible, this fluid being replaced by a glass of fluid taken one hour before dinner and supper, with the necessary precautions already described. These simple measures generally suffice to re-

lieve the patient of his aerophagia within a week or two, and frequently less.

The patient should also be ordered to avoid drinking very hot fluids, especially hot milk or infusions.

Milk is credited with the untoward effect of causing gas to form in the alimentary tract, and this property doubtless accounts in part for the aversion which many persons, especially women, have to it. Possibly there is some truth in this view concerning milk, but in most instances the collections of flatus in the abdomen following its use seem due to the fact that the milk has been taken very hot, in accordance with a time-honored custom. When thus taken, it can be drunk only in separate mouthfuls, which tend to cool it off in the oral cavity, and this mode of ingestion undoubtedly favors the swallowing of more air than of milk.

Indeed, actual trial definitely shows that upon drinking the milk only moderately warm, with the upper lip dipping into the fluid, the so-called "wind colic" from milk is practically done away with.

The same considerations apply in relation to the infusions which many patients with so-called flatulent dyspepsia take at the close of their meals in order to promote digestion. These are ingested while very hot—in fact, as hot as possible—and again in separate mouthfuls, and there results the swallowing of a considerable volume of air; the aerophagia is thus being treated by a measure causing further aerophagia.

Hence, hot infusions after meals must be discountenanced in all patients with gastric dyspepsia who are suspected of being aerophagic.

In most instances it is unnecessary to administer any drugs. Where, however, the gastric discomfort is accompanied with burning sensations in the stomach or with acid

regurgitations, absorbent and antacid powders are serviceable. It is essential, moreover, to make certain that the bowels are being properly evacuated daily. Finally, in the highly nervous type of aerophagic, tuberculous patient, when the attacks cause considerable distress, with spasm of the esophagus, pronounced contractions of the abdominal aorta, hyperesthesia in the region of the solar plexus, or intermittent excessive peristalsis of the intestine, it is well to administer antispasmodic agents, particularly ammonium valerianate in rather large doses. It should be borne in mind, however, that this measure is mainly psychic in its action, and that in the average case proper explanation to the patient of the cause and interrelationship of the existing disturbances constitutes in itself one-half of the remedial procedure required.

If the aerophagia is coupled with sialorrhea and sialophagia, the case is a more difficult one to handle, as it already verges on an actual mania or tic, with a phobia as regards the swallowing of discharges from the lung. This condition leads the patient to form the habit of expectorating whenever there is any saliva in the mouth. In spite of himself he swallows some of it, and during the efforts he makes not to do so, he drives down some air through the esophagus.

Psychotherapy is really indicated in such cases. Especial care should be taken to make the patient understand that what he is constantly expectorating is not actual tuberculous sputum, but merely secretions from the mouth and pharynx, and that there is no harm whatever in his swallowing this sputum in a natural manner without effort or spasmodic contractions, and in actually expectorating only when the act of coughing has brought up a mass of true discharge from the lung. One should not expect, however,

in these cases to obtain such frequently successful, complete, nor especially, such rapid results.

Lastly, it should be remembered that many tuberculous aerophagics differ from admittedly well or physiologically aerophagic persons only in that they have lost the power of voluntary eructation. It is therefore advisable, in general, to inform the patient of this circumstance and to drill into him thoroughly the fact that in order to assist in his recovery he must strive to reacquire the missing faculty of eructation, which enables him to evacuate from the stomach at will any gaseous accumulations that may form in it.

**Supplementary Foods.**—Summarizing previous remarks concerning the diet, it may be stated that in many cases of tuberculosis, granting that they are able to eat, it is unnecessary to insist upon any special form of diet. Well prepared food, which they are soon able to enjoy owing to the favorable effects of the open air and rest treatment, is sufficient. They eat everything, and a good deal of each thing, and gain in weight rapidly.

Not all patients, however, are able to do this at once. Some are laggards in the diet treatment. At first, they have to have a specially supervised diet. Or, while eating a little of everything, they do not take enough of each thing. They hold their own, but do not gain weight. The various exceptional régimes are especially indicated in this group of cases.

Such patients should be required to take, either as an addition to their incomplete meals or between meals, highly nourishing foods of the smallest possible bulk.

The article of diet occupying first place in this connection, and which can often be relied on, is *raw meat.*

People are often afraid of raw meat on the ground that they may get a tapeworm from it. This is a childish idea.

Eating beefsteak raw or rare amounts to precisely the same thing. Few people are afraid of rare beefsteak, being unfamiliar with the fact that to kill the cysticerci of the tænia parasite, meat must be cooked through completely. At the worst, moreover, raw lamb may be used, although its taste is much less pleasant, and besides, it seems to have been shown that lamb may likewise contain the germs of certain worms.

Finally, even acquiring a tænia is not such a terrible thing. For since the discovery of pelletierine, it has been the easiest thing in the world to kill and expel the parasite with almost complete certainty in about three hours.

The raw meat can be taken in any desired manner. Each patient has his favorite way of taking it, *e.g.*, as a fine pulp made by passing it through a sieve; scraped with a knife, or simply well chopped up. One must not, however, expect all tuberculous patients to bear the raw meat well, even temporarily. It is an excellent food, like codliver oil, for these cases; but it must be well digested.

Not a few patients, even without diarrhea, eliminate it practically unchanged; many others find that their stools become offensive when they take it and lose this characteristic as soon as they discontinue it.

For some time past semiliquid preparations of preserved raw meat have been commercially available. Many of these are well put up and much relished by the patient, *e.g.*, such preparations as carnine, musculosine, etc. It seems to us to be unquestionably a fact that meat when given in this form for overfeeding purposes is much better borne than when in its native state.

In conjunction with raw meat may be considered *meat powders* and peptones, which unfortunately present the same disadvantages as the raw product.

Meat powders have, as a rule, the marked defect of being tolerated by patients only for a short time. Boxes or bottles containing such powders develop a rather unpleasant aroma within a few days after they have been opened. It is a fact, however, that these powders made from meat alone or meat mixed with various kinds of flour are now being much better prepared than formerly.

*Peptones,* constituting a species of predigested meat, are claimed to represent even better than meat powders, in small bulk and in a palatable form, considerable amounts of ordinary meat. Good brands of peptones are excellent preparations which the most fastidious patients take willingly in solution in various vehicles.

*Eggs* also constitute a food of the first order for the exceptional régime, as they are so easily taken. Many patients take them raw or but slightly warmed, from the shell; others take only the yolk. A rather pleasant and rarely refused combination is that made by mixing the yolks of one or two eggs in black coffee with sugar, or in coffee with milk and sugar.

One should not conceive the idea, however, that eggs in any form are always quite excellent and harmless. Not a few persons, whether in health or illness, absolutely cannot take them without being later seized with digestive disturbances—either pain in the stomach, intestinal cramps with toxic manifestations, or a liver upset with regurgitation of bile into the stomach.

These manifestations of intolerance in the majority of instances follow ingestion of raw or undercooked eggs, and are decidedly uncommon after taking soft or hard boiled eggs. This is an important thing to note for the benefit of persons required to use this excellent article of food in large amounts.

Ever since attention has been paid to ***lecithin*** in therapeutics, the laity, who often go to extremes in their conceptions of things, have come to the conclusion that in eggs, the yolk alone is of value, and that the white is an entirely negligible material. Acting on this idea, some patients have been wasting a dozen or more eggs a day in order to take the yolks alone. Aside from the great expense entailed, this is even at best a useless procedure.

A patient who is eating little or nothing will manifestly derive much benefit from ingesting six or eight yolks of eggs mixed with hot water and sugar or otherwise prepared, and will digest them better than two or three entire eggs. But this procedure belongs really under the exceptional régimes.

Three-fourths of all patients are able to take eggs in their entirety. The white and yolk mixed form a complete and excellent food. Taking an egg is equivalent to taking an average of 40 grams of readily assimilable meat, while if the yolk alone is taken, this is reduced to 15 grams.

Among the liquid foods, first place should be given to ***milk*** of good quality and to medicinal malt beverages.

In some countries, cows' milk is made a regular constituent of the tuberculous patient's diet.

Personally, I consider milk one of the best auxiliary foods in feeding these cases. It is perfect as a complete food, with the added advantage of stimulating the emunctory function of the kidneys. But unless there are special therapeutic indications I never prescribe it as a regular feature of the diet. In the exceptional régime, however, it serves in the same manner as raw meat and eggs. Many patients, indeed, take several cups of milk between meals of their own accord.

Fermented milk preparations, represented in particular by *kephyr,* are much used for tuberculous patients troubled with digestive disturbances, but are also employed generally as simple, easily taken, and well assimilated foods. I have often had occasion to note the fact that, if kephyr is to be well borne for any length of time, it must be very carefully prepared.

Similar considerations apply in the case of *beer.* Aside from its use by patients who take it of their own accord between meals, we use it for auxiliary feeding. We then select the malted beers, or better, stout or porter, which give good results when freely used.

Lastly we come to *codliver oil.* This is a drug that acts admirably when taken in large amounts, *i.e.,* when well borne. It constitutes at once a fatty food, perhaps the most assimilable of all such foods, and a remedy, the undoubted therapeutic value of which is, however, open to a number of different interpretations.

Codliver oil, taken in doses of six to eight tablespoonfuls a day, produces, when well tolerated and absorbed, most remarkable results. It must not, however, in any way upset the stomach; must not disturb the bowels, and must not appear unchanged in the feces. Finally, it must not induce liver disturbances. There is no doubt—and it is well not to forget it—that codliver oil may within a few days, in patients with more or less insufficient livers, induce either simple hepatic distress, an attack of gall-stone colic, or an uncomplicated jaundice. As such a disturbance, if it occurs, can easily be traced to its cause, discontinuance of the remedy suffices to bring relief.

Any practitioner can cite instances of wonderful recoveries due to the tissue-restoring action of this product.

Unfortunately it is not always possible to get the patient to take codliver oil in large doses, in spite of patience and ingenious devices on the part of the physician and of good will on the part of the patient. Indeed, such a result is attained only in a very small minority of the cases, whatever artifices to favor its ingestion be employed.

Next to codliver oil comes *butter* of good quality. This is a food of the first order, which, if necessary, may be substituted for the oil. It possesses the advantage of being palatable to everyone and of being taken with other food.

An important distinction must here be made between good quality butter, fresh and eaten raw, and butter, even of the highest grade, that has been cooked in the kitchen. Butter is the chief factor in all plain or fancy cooking, but when it is heated in cooking food it sets free various aromatic fatty acids which unfortunately are not tolerated by the stomachs of dyspeptics and contribute largely to the production of pyrosis and burning sensations or actual pain in the stomach.

Raw butter, on the other hand, is nearly always well borne and gives advantageous results in tuberculous patients with sensitive digestive tracts. Hence the altogether rational custom of serving the vegetables and starchy foods simply boiled, the patient adding fresh butter to them himself on his own plate.

The above list of foods appropriate for the exceptional régime might be extended to an indefinite length, for in late years commercial procedures have brought into being a host of products, vegetable, animal, or simply chemical, which are capable of rendering service on occasion. There is no lack of choice. But the difficulty does not reside in this.

The foods to be taken must be assimilable. As an old adage says, only that which is assimilated nourishes.

In this respect one is face to face with a problem which it will be advisable for us to discuss before taking up the question of overfeeding.

**Special Dietetic Devioes.**—Ordinary everyday food is sufficient in the treatment of three-fourths of all tuberculosis patients. If such food proves unsuitable, in a given case, the patient must have some local or general trouble which is at the bottom of the difficulty. One subject, *e.g.*, has absolutely no appetite; in another, the stomach rebels; in a third, there is impaired gastric or intestinal digestion, etc. In the case of these tuberculous patients, whom I have termed the abnormal candidates for dietetic treatment, the terms of the procedure have to be reversed. Before they are placed upon the ordinary, everyday diet, they will have to be given as a regular diet articles employed as exceptional foods by the normal candidate for dietetic treatment.

Here is where the ingenious devices of the physician should come in. Tuberculous patients who are not eating at all must be made to take food. A beginning must be made with something that they can be induced to accept, whatever it may happen to be. Gradually the digestive functions pick up, and the best foods can then be selected. But at the start, the best foods consist of anything that the patient can take in and digest. Any procedure to attain this end is justified. At times, gavage with the stomach tube has to be resorted to to initiate a whipping-up process of the assimilatory functions. Gavage could hardly be of service save as a quite temporary mode of feeding, employed in order to obviate the ultimate serious effects of anorexia or of obstinate vomiting. For if gastric digestion is to be normal, it requires the preliminary preparation of food effected through mastication and insalivation.

It is under such conditions that one becomes aware of the fact that the theoretical schemes of diet based on chemical studies are often at fault.

I know of a former tuberculous subject, now entirely well and who has been so for several years, who had high fever morning and evening at the beginning of his illness and found it wholly impossible to ingest ordinary foods. For over two months he fed himself exclusively on raw eggs, of which he took eighteen to twenty-four each day, together with a relatively large amount of good quality wine. It was under this diet that he overcame his fever and held his tubercle bacilli at bay until finally he became able to eat a little bread.

In another instance, I had under my charge a man aged about fifty years, tall of build, a type of individual whom one would expect to reach the century mark if he led a regular life. This man, however, a great adventurer and globe trotter, had indulged in all manner of excesses, especially alcoholic. When seen, he was in an emaciated state, with fibroid tuberculosis of both apexes, and could take no food at all. He lived exclusively on wine, various strong liquors, and absinthe. He spat blood, and sometimes vomited blood. During several months, placed under the open air and rest cure, he fed himself on raw meat, consisting of a large raw beefsteak which he ate morning and evening, in combination with a little onion and two varieties of garlic, likewise taken raw.

Little or no bread or vegetables were consumed, but he continued to take considerable quantities of wine and rum. On this combination he got into splendid shape, gained a number of kilograms in weight, cleaned up his pulmonary lesions in remarkable fashion, and left the sanatorium no less an alcoholic than he had been upon his

arrival, but nevertheless completely transformed. It is the cases of this type—and they are not extremely uncommon —which have led a few highly reputable authors to state that some consumptives are "conserved" by alcohol.

Brief mention may be made of another patient who succeeded in getting rid of his fever by taking every day, exclusively, 450 to 500 grams of meat, eaten raw with knife and fork, and 1½ to 2 liters of good milk.

These observations, together with many other similar ones, show that when one meets with tuberculous patients who do not tolerate, or rather do not eat, the ordinary, everyday articles of food, any convenient form of régime should be instituted, even if it is not in perfect accord with the theoretical indications of physiological chemistry.

## CHAPTER III.

### OVERFEEDING IN TUBERCULOSIS.

WHILE an ample diet has been recommended for the tuberculous from time immemorial, a number of years ago actual overfeeding was introduced. The term is self-explanatory but may nevertheless be of somewhat variable signification. To overfeed a person may properly be taken as meaning that in addition to his customary more or less rational diet, he is to take supplementary food either with or between meals. This was the actual plan generally followed some thirty years ago.

The patients consumed as much as they could at the larger meals, and from morning till night, and even during the night, they were stuffed as much as seemed possible with milk, butter, eggs, raw meat, cold meats, codliver oil, beer, and even alcohol.

Gradually, however, some modification in the meaning of the term took place.

At present, not a few patients claim that they are undergoing treatment by overfeeding when, being without appetite and eating little or nothing at the table, they take at the close of each meal an egg or two, often the yolk alone, and three or four times during the day one or two eggs, or yolks of eggs, some raw meat, a few cupfuls of milk, etc.

As a matter of fact these feedings constitute simply the exceptional régime, already discussed.

For a number of years, we practised this overfeeding treatment of our sanatorium patients. It was universally recommended; it was the fashion; the ball had been started

rolling, and it was unthinkable that any consumptive should get well in any other way. Rare meats, raw meat, and eggs were the great factors in the procedure. Some practised overfeeding by eating stupendous quantities of meat at the table, without mentioning the other food taken; others, by taking eggs and raw meat at the close of the meals or between meals.

That was the period during which, on the principle that arthritic subjects developed only comparatively mild, fibroid forms of tuberculosis, the object sought was to cure patients by turning them into arthritics, like many gouty persons, through pushing a meat diet to the limit.

But it was also the period of daily, unaccountable hemoptysis. The overfed consumptives brought up blood, without knowing why.

It was also the period in which consumptives had attacks of congestion of the lungs—attacks due to "minor causes," as they were then spoken of.

It was likewise the period in which a host of patients, after having admirably profited from their treatment for one, two, or three months and been expected to recover, were seized with all manner of disturbances which placed them again in a precarious condition—digestive disorders, diarrhea, congestion of the liver, gall-stones, glycosuria, nephrolithiasis, albuminuria, etc.—not to mention a recrudescence of the disease process in their lungs.

Unquestionably, not a few patients failed to recover who today would make certain and rapid recoveries.

Finally, attention became focussed upon these unfavorable happenings and overfeeding began to be suspected as their cause.

Having firm convictions on the subject I sounded a warning by publishing some years ago a few articles

setting forth the harmful effects of overfeeding, and at once from all sides corroborative observations were brought out in support of the stand I had taken, and comprehensive publications on the subject appeared. At the present time, therefore, when overfeeding is referred to, it is usually for the purpose of setting forth its disadvantages, and it is better to state simply that tuberculous subjects require a *plentiful* and *rational* diet.

An immediate and striking result of the altered practice in our own institution was to cut short the daily, everlasting, absurd hemoptysis which kept the attending physicians perpetually on edge. Indeed, aside from menstrual hemoptysis, three-fourths of the attacks of hemoptysis in consumptives were of alimentary origin.

A more remote, but no less remarkable result was that by emphasizing the subject of artificial tuberculous ulceration of the lungs we were able to protect many patients from various complicating disturbances and also frequently to cure them, where previously we had seen them dragging on in their illness and remaining invalids.

Such are the main facts of the question, considered from the general standpoint. Further details may now be given.

It is undoubtedly true that some consumptives are able with impunity to take a large amount of food, or even practice overeating with meats for a protracted period without ill effects, and recover more or less rapidly.

The remainder may be divided into two classes.

Some are able to take a large amount of meat, but only for a certain period. Subsequently, if they persist in the overfeeding treatment, they develop various complicating disturbances, of which alimentary hemoptysis is generally the forerunner. If the physician, thus warned, then wisely

makes a radical change in the diet, all these disturbances pass off like magic, and progress toward recovery sets in with greater speed.

The other class of patients, even at the beginning of treatment, cannot tolerate any special meat or so-called "tonic" diet. If, ignorant of the fact, one continues along this mistaken course, these patients not only fail to gain, but often lose ground. To give examples of this would be unnecessary; they are met with incessantly.

These conditions constitute what I have termed *secondary intolerance* and *primary intolerance* of overfeeding.

Finally, there is a third category of tuberculous patients who may ultimately belong in either one of the above two classes but who at the start, for a number of days at least, exhibit primary and almost complete intolerance. These are patients still under the influence of overwork. To them, with their high fever, congested lungs and liver, and scanty urine—the latter often laden with bile pigment and other products of excessive organic combustion—the words *noli me tangere* are precisely applicable. An antipyretic drug may kill them in twenty-four to thirty-six hours, and if, on the ground that they are consumptives and on the basis of the overfeeding theory or even of the prevailing ample diet theory, they are urged to eat considerable amounts of food, all their disturbances are at once multiplied tenfold.

These patients are amenable to only one line of treatment, *viz.*, rest and a liquid diet. Not infrequently, in two days the fever will be found to subside of its own accord, the skin to become brighter, the urine abundant and clear, the liver to contract, and the lung to undergo decongestion in a most striking manner.. This belongs to the domain of general clinical medicine.

A long time since, I had called attention to the question of overwork in tuberculosis, and had settled upon a definite line of therapeutic procedure, applicable in this connection.

When, however, I became convinced of the harmful effect of overfeeding, the question as to why this harmful effect took place obtruded itself. It seemed to be a fact that both the attacks of alimentary hemoptysis and the other disturbances due to overfeeding occurred mainly in patients with some cardiovascular defect.

One should not conclude, of course, that all tuberculous patients have impaired hearts and are destined to die later from some cardiac disease. It is already sad enough to note, as I have for twenty years, that about half of the sanatorium patients have some form of circulatory disorder. As for the source of this disorder, it certainly varies in different cases, but I strongly incline to the view that it dates back to the period of growth, as a rule so disturbed and poorly directed in those who are later to develop tuberculosis. The whole system yields in the face of the exaggerated growth of the bony framework, including the heart, which is insufficient for its existing task. All this passes unnoticed, and rights itself of its own accord. But when growth has been completed, if tuberculosis sets in, at once a slight valvular trouble in the heart will be observed, which valvular trouble will be greatly aggravated for the time being by any mental, physical, or even dietary excess, not to mention the intoxication by the poisons of tuberculosis themselves. The fears of the young patients and their families as regards the heart condition should, however, be set at rest; for when the patient is cured of his tuberculosis he will have no occasion to pay any more attention to his heart than he had before he contracted the disease.

Nevertheless, as long as he remains at grips with the pulmonary disorder, the physician will have to reckon with the condition of his circulatory system.

Reference is not here made, of course, to patients who at some time in life have had some definite cardiac affection which is at once apparent to the physician when they come to consult him for tuberculosis. This is ancient history, and such cases are generally recognized.

On the whole, it will be seen that the problem of treatment in tuberculosis is not as simple as it may have appeared to be only recently, when tuberculosis and overfeeding were inseparable terms. As in many other things, the question is one of degree.

The fundamental conception of a dietetic treatment is manifestly a good one. Tuberculosis means loss of strength, and loss of strength indicates roborant measures to help wage the necessary battle. But for a period of at least twenty years, too little attention was paid to what our former teachers had so clearly recognized, *viz.*, that the physician is expending his efforts on the tuberculous patient and not on the tuberculous process, against which we do not as yet possess any direct weapon; that each patient has his own way of being tuberculous, according to his constitution and the condition of his vital organs, and that the care of consumptives does not belong to the domain of special medicine, but to that of general medicine.

When the physician undertakes to treat a tuberculous patient whom he deems at least susceptible of improvement, it is especially necessary that he should make a careful study of that patient's general and local deficiencies and determine, if possible, the degree of integrity of the organs other than the lungs. Such an inquiry is the proper starting-point of all therapeutic endeavors.

The ultimate conclusion is that, as regards diet, there must be found for the tuberculous subject a dietary formula which is adapted to him individually. Proceeding along this line, one must not only discover this special formula when added disturbances of some sort give warning that the treatment is on the wrong track, but must be prepared to predict if possible, by thorough, thoughtful examination of the consumptive who places himself in one's care, that such and such a dietary formula will be adapted to his requirements. As usual, this is a matter of experience.

Without going into undue detail, it may be stated, in a general way, that in the matter of overfeeding or ordinary feeding, two things must be considered in tuberculous cases, *viz.*, quantity and quality.

There are some patients who, after having been rescued from their state of general physical depression and while progressing toward a cure, find it imperative to reduce the total amount of food taken, irrespective of the kinds of food used. A mixed diet of meat and vegetables suits them well provided they are moderate in everything.

There are also patients, however, who under the same conditions, after markedly improving, develop untoward disturbances which are of unmistakable significance to the experienced physician. In these cases it is not a question of the quantity of the foods taken, but of their nature. When the meat factor in the diet is eliminated, equilibrium is re-established. One may go even further than this. Some of these patients who were no longer able to take even a reasonable amount of meat and other foods, are now enabled to take a larger amount of lactovegetarian food, upon which they now proceed to cover the remaining distance on the road to recovery.

All this works out with remarkable precision in the clinical management of tuberculous cases. And the picture is completed by this further interesting fact:

Patients whom, on account of *secondary intolerance* of meat diet, the physician has had to place on a diet of milk and vegetables or of vegetables and starchy foods until their recovery has been completed, are able, after their recovery is well established, gradually to return without difficulty to the ordinary diet used by every one else. I could cite a considerable number of such cases in tuberculous subjects whose recovery has been completely maintained for several years. This is accounted for, *in a general way,* simply by the fact that these patients, restored to a more active mode of life and greater expenditure of functional energy, are possessed of increased power to assimilate food. There are exceptions to this general rule, however, and the physician may meet with certain subjects who, after recovery, are no longer able to ingest the large amount of ***substantial*** food which they tolerated before their illness.

## CHAPTER IV.

### MEDICATION IN TUBERCULOSIS.

THERE are available, as we have already seen, a number of drugs the mode of action of which can be explained by physicians in a variety of ways, some describing them as specifics, others as stimulants of the digestive functions, while others still look upon them merely as ordinary general tonics. To the laity, however, accustomed to seeing these drugs—always practically the same—prescribed as soon as lung trouble is thought of, these are specific, antituberculous agents.

**Creosote.**—The most vaunted among them are creosote and its allies.

From the start these were administered by the mouth. But on the ground that the stomach is the consumptive's ultimate fortress, and must be spared unnecessary stress at all costs, and in view of the fact that in many patients they were not well borne, the practice of administering them by rectum in various forms of enemas was introduced. As bowel irritation often resulted, with tenesmus and frequent movements, they were then injected under the skin, alike to obviate the unpleasant effects just referred to and to secure a more rapid and powerful action. Sometimes creosote is injected alone; or, other agents such as eucalyptol, etc., are added to it. At the present time, guaiacol in various forms is most favorably regarded.

Whatever views may be held as to the mode of action of these remedies, it is not easy to estimate their true value. As already stated, tuberculous patients with fever generally do not bear them well. This, indeed, argues against a

direct action on the tubercle bacillus. In patients without fever, unbiased observers declare that in small doses they exert favorable effects upon the digestive functions and the lung secretions.

One circumstance must be well taken into account in forming an opinion of the value of these drugs. In practice two kinds of patients are met with, the well-to-do and the poor. What practitioner, consulted by a patient financially well off, does not order him to follow a special hygienic treatment, comprising rest, as much pure air as possible, and a generous diet, in conjunction with the administration of creosote or its allies? How many schemes of treatment we have seen which did, indeed, include creosote or guaiacol in some form, but likewise included overfeeding with meat powders, raw meat, codliver oil, etc., not to mention the customary hygienic measures. The patient improves as a rule. But was it the creosote that caused him to improve?

In the case of poor consumptives, the facts are still more striking in hospital practice. The hospital physician takes one of these unfortunate subjects, still able to digest but absolutely exhausted because he has not had anything to eat but, as one might put it, "slop" for months. He supplies him with a good bed, puts him at rest, brings him food, not prepared by the highest type of cooking, but wholesome and plentiful; the patient loafs in the garden part of the day, putting aside all the cares of life, goes to bed early, and gets up late. He takes some medicinal agent, creosote or other, by the mouth, rectum, or hypodermically. In a few weeks he is completely changed, gains weight, coughs less, and is up and about. Is the conclusion that creosote saved him warranted? Actually, this poor, famished individual has been given food; this exhausted body has been given

rest. Under such conditions, he might have been given any harmless drug and the result would have been quite the same—or nearly so, if it be admitted that the creosote may have been of some slight assistance in improving the digestive functions and reducing expectoration.

From this it will be seen how easy it is to make a mistake in estimating the favorable effects of medication in tuberculosis.

Let it be noted at once that my criticism is presented entirely in good faith and that I am not indulging in disparagement based on prejudice.

During the period of thirty years in which I have been directing the treatment of many consumptives of all sorts, I yielded in the beginning, for the first few years, to prevailing views by administering creosote.

It must be frankly confessed that the curable patients receiving it progressed no faster toward recovery than others, quite comparable in all other respects, who did not.

My observation has been that the tuberculous subject capable of recovering or of being considerably improved requires no so-called antibacillary drug from the time he is placed on the hygienic treatment. The effect on the digestive functions and that on the lung secretions, which may, at the best, in all sincerity be attributed to these various drugs, is quite unnecessary for him. The gastrointestinal functions show betterment, the disease foci in the lung clear up, and the sputum and oppression diminish from the effects of the open air and rest treatment alone. They constitute its first results.

Under these circumstances we have practically discontinued giving creosote and its allies to our patients; and our results have been none the less satisfactory. Our consumptives, indeed, are glad of it, for aside from doing well, they

no longer experience any of the minor disadvantages of these drugs and their pocket-books are no worse off, which is something to be considered.

It may be added that the patients themselves are the first to request discontinuance of such and such a drug which they had been taking before being placed under the hygienic treatment. What answer can possibly be given to a consumptive who comes to us still saturated from hypodermic injections of creosote, eucalyptol, or guaiacol; who left off the injections during the first days of rest after his journey to the sanatorium, and who, a week later, feeling himself revived by the air cure, asks us if it is really necessary for him to submit again to this daily traumatism?

**Lime Salts.**—For some years, treatment with lime salts has been coming back into vogue—far more intelligently applied and regulated than formerly, however, this return to favor having been preceded by numerous, striking investigations on the physiological chemistry of tuberculosis and, in particular, on the loss of mineral body constituents, too often an unwelcome accompaniment. On the basis of these theoretical conceptions, dietetic régimes have been instituted which cannot fail to be of service in a considerable number of cases as they, in large measure, correspond to the rational type of treatment. When the food and drink of a tuberculous subject who has previously not been following normal lines in these respects are brought under rigid control, at least temporary success for such a procedure can be predicted, even if no attention is paid to his lungs nor his tuberculous infection.

The recalcifying régime, as it is called, is a useful measure. It remains to be ascertained whether the lime phosphates upon which it is based actually do play the capital therapeutic rôle that is being expected of them. For

it cannot, perhaps, yet be said to have been well shown that the human organism assimilates phosphates that have not previously been prepared for it through activities of the vegetable kingdom. True, even if they are but imperfectly absorbed they may nevertheless be useful in other directions, like many other similar compounds, in the processes of gastro-intestinal digestion.

**Iodine.**—For a few years, treatment with tincture of iodine in large doses has come back into favor, and has been credited with remarkable cures and instances of unexpected improvement, maintained for years.

In view of these claims, we have subjected the measure to prolonged trial, and without any intention to disparage the observations just referred to, our findings were as follows: Unquestionably many tuberculous subjects of all categories are able to take rather large amounts of tincture of iodine for a prolonged period, *e.g.*, 100, 150, or 200 drops a day, without ill effect. A few experience slight anginal symptoms or intestinal disturbances which cease as soon as the remedy is discontinued, but these are exceptional.

As for the results obtained, they have not seemed very clear cut. It is quite true that in the sanatorium our patients were enjoying the benefits of the rational hygienic treatment and that the latter might have accounted for the rather satisfactory condition observed, a condition corresponding to that noted regularly among patients not receiving iodine; on the other hand, it is likewise true that iodine in large doses may have given satisfactory results in cases elsewhere, not subjected to sanatorium treatment, and upon which, therefore, no definite opinion can here be expressed.

Personally, I have seen a quite remarkable effect from iodine in one case. The patient was a young man who, fol-

lowing overwork, contracted an attack of apical tuberculosis of the bronchitic type, with moderate fever, but marked especially by an almost constant asthmatic state which for two months had given him little opportunity to sleep and rest. Tubercle bacilli were found. All rational and other medicinal measures had completely failed. From certain indications I was led to suspect that this tuberculous asthma might be due to the presence of enlarged glands at the hilum or bifurcation of the bronchi. This was clearly confirmed by x-ray examination.

The tincture of iodine treatment was instituted, without other medication. Distinct improvement occurred in two weeks, and by the time the 100-drop dosage was reached, the whole trouble had disappeared, the patient was considered cured, and he returned to his customary mode of life, though keeping up hygienic precautions.

No other opportunity has since presented itself to try the iodine treatment under similar circumstances.

**Sulphurous Waters.**—Sulphur-laden waters have played a rôle of considerable importance in the treatment of lung disease, whether taken at home or directly at the source; sulphur springs are still in high favor for treatment of consumptives.

When, in former times, tuberculosis was confounded with chronic bronchitis, pulmonary catarrh, etc., all patients with chronic lung trouble were indiscriminately sent to the sulphur springs. Many patients unquestionably derived marked benefit therefrom.

Since the time when the tubercle bacillus began to be detected, hidden away beneath the majority of catarrhal lung conditions, greater reserve is shown in respect of the sulphurous waters, and the indications for the sulphur spring treatment have been more specifically defined.

While a specific action of sulphurous waters on tuberculous lung lesions is no longer claimed, it is recognized, and justifiably so, that certain forms of tuberculosis, more or less sluggish, without general erethism, among so-called catarrhal subjects, derive benefit from a course of treatment at such resorts as Eaux-Bonnes (France).

The cure at Eaux-Bonnes gave good results for centuries, and there is no reason why it should now suddenly cease giving results, from mere fashion or solely from the fact that the bacterial agent of tuberculosis is now known. There is no true motive, therefore, for abandoning the sulphur spring resorts.

One must, however, in the first place select the cases to be sent there, and in the second place see to it that the patients do not lose, through faulty hygiene, what benefit they gain from the mineral water cure.

Two factors co-operate in the beneficial results from the thermal cure. First, there is the sulphur medication, applied internally and externally, which must be systematically and cautiously regulated by the physician, lest it do, as is too often the case, harm instead of good. Secondly, there is the fresh air and rest treatment, which should be applied, as a rule, in some resort pleasantly situated in the mountains. Physical and mental rest is an indispensable adjunct of the mineral water cure.

If the consumptive goes to a thermal resort to take the waters and throughout the time he is there leads a fatiguing, overstrenuous life, with a ceaseless round of pleasures, far better would it have been for him to go and rest quietly in the country.

The unwholesome mode of life too often led in thermal resorts is the chief reason for a majority of the failures of direct sulphur water treatment, and the patients who, after

three weeks of social diversion, fatiguing excursions, and overstrain, leave the resort quite exhausted and more ill than they had been at their arrival, make no bones about casting discredit on the thermal cure, never being willing to admit to themselves that the lack of success was due solely to the mode of life they indulged in.

**Arsenical Waters.**—All considerations related to the sulphur waters are completely applicable also to the waters based on arsenic, of which Mont-Dore and La Bourboule are the type in France. Where direct indications for such treatment exist in a tuberculous patient, and where he actually does carry out at the resort a season of rest and quiet, avoiding all excesses in diet or physical exertion, remarkable benefit will not infrequently result; in the opposite event, however, the results will only too often be pitiable, notwithstanding the waters and the physician, who finds himself helpless in the matter.

In other words, as usual, wherever the consumptive goes to restore his health, he must follow the principles of the rational treatment.

The impression should not be gathered that I consider these and other similar forms of medication prejudicial and useless. Proper distinction of cases is necessary.

In practice, independently of the hygienic conditions afforded by treatment in the country, consumptives derive benefit from the restorative effects of a large number of drugs, just as do those afflicted with other chronic diseases, and it is the proper thing for physicians to use them because it is well known that patients are thus considerably benefited.

With the hygienic treatment as we apply it, however, conditions are entirely different. By virtue of the completely altered, healthful plan they are following, the con-

sumptives rapidly mobilize, by way of reaction against the disease, all the reserve power their system can bring to bear, and the medicaments referred to, while of prime importance in the cities, therefore become entirely accessory measures.

Therein lies the crux of the matter.

Within the last twenty years, a new factor has been added in the question of medicinal treatment in tuberculosis.

**Tuberculin.**—Koch's tuberculin never passed entirely into oblivion, in spite of its widely advertised failures thirty years ago. Soon after, one or two other forms of tuberculin were brought out. Then, each year or even oftener, related products appeared under various names—usually as "antituberculous serums," distinguished from one another by the names of their sponsors.

Articles and papers read before learned societies and medical congresses appeared in enormous numbers, each observer naturally and sincerely believing that his product constituted the nearest approach extant to the true antituberculous serum which is still being persistently sought and the possibility of which we are still dreaming about.

Each of these serums seems to have been productive of some cures, and specialists affirm that in certain instances they obtained very distinct service from their use.

Yet, aside from the results obtained in surgical and skin tuberculosis, which are quite a different matter, it must be confessed that we are far from any consensus of opinion as to their having any more or less specific action.

That each of these serums may have appeared to contribute, in a most clear cut manner, in curing some cases of tuberculosis, including even grave ones, is not to be wondered at. This simply bears out the well-known fact, long since recognized, that even grave cases of tuberculosis

have been known to recover under any possible form of medication.

In pulmonary tuberculosis more or less remarkable instances of improvement, or even one or two still more remarkable instances of cure—miraculous cure, if one wishes to put it thus—are quite insufficient evidence of the efficiency of any given form of serum against the tubercle bacillus, because such apparently remarkable results are a matter of common observation.

## CHAPTER V.

### MEDICATION AGAINST FEVER.

Aside from complications which induce fever, consumptives are subject to two types of temperature elevation. The first may be termed fever from wear and tear, or overstrain; the second we shall call, like every one else, tuberculous fever.

### I. Fever from Overstrain.

Fever due to overwork will be described in greater detail in a subsequent chapter, along with the other harmful effects of overwork in the tuberculous. Let it merely be noted here that, when this type of fever makes its appearance in a previously afebrile patient, or becomes superimposed upon the usual temperature range in an already febrile patient, it is amenable to a single essential, and—fortunately—sufficient measure of treatment, *viz.*, rest.

### II. Tuberculous Fever.

This form of fever I shall not describe at length, as it is too well known to both physicians and patients, even though not a few of the latter, by some special form of dispensation, sometimes experience it for a long period without being aware of the fact.

Indeed, in tuberculosis the patient becomes accustomed to everything that recurs daily; this is one of the causes of his admirable delusions as to the prognosis.

This type of fever, while termed simply tuberculous fever, not infrequently results from a variety of abnormal

processes among which the tubercle bacillus plays a more or less prominent rôle. Obviously, any of the bacterial influences which, exerted along with those of the tubercle bacillus, constitute tuberculosis, may appear as important factors in its causation.

Tuberculous fever is not seen as a fever quite distinct from all other factors among any patients save those on rest treatment. Patients not yet under control, while regularly exhibiting temperature, also have at all times a supplementary fever due to overstrain.

Upon arriving at the sanatorium they show a much higher temperature than they will after a few days of fresh air and rest treatment, when they have eliminated the excess of the effects of overstrain.

Up to this point, as may readily be fancied, any antipyretic drug will have a splendid opportunity to lower the temperature of these patients for the first few days; it will even have an opportunity to eliminate fever completely if such fever has been due to overstrain alone.

But after the patient has brought his fever down to its actual, and not its apparent, level; when the first few days of treatment have resulted in the usual favorable effects, then it is a different matter.

No known drug, I believe, is capable of causing this tuberculous fever to disappear. It can be broken, subdued, or forced down momentarily; anything that one may wish to do to it can be accomplished, at least to some extent, as it allows itself to be easily influenced by our modern antipyretic remedies—but that is all.

The reason for this is not far to seek. This residual form of fever is based on morbid activity in the pulmonary lesions, which unfortunately are beyond the reach of our present medicinal measures.

This rather summary dismissal of antipyretics as agents appropriate in tuberculous fever will doubtless prove somewhat of a surprise to the reader, but, while freely desirous of believing in a possible case of tuberculous fever eliminated by drugs, the writer must confess that he is yet to meet with an authentic instance of this kind. In our experience, anything which seemed to approach the production of such a result had to do merely with fever from overstrain.

A very searching inquiry into the actual facts in the individual case is therefore necessary for proper appreciation of the therapeutic effects.

True tuberculous fever, with its naturalization papers, as one might put it, is not eliminated in a week's time. In this connection, reference is not being made to the acute complications in tuberculosis, the so-called acute exacerbations; what we are concerned with is something quite different.

As a matter of fact tuberculous fever yields, in common with the fever due to overstrain, to removal of its cause. This cause is the active process in the pulmonary lesion, and this active process disappears only through restoration of the patient's general condition. The best antipyretic remedy in this connection, then, is the systematic hygienic treatment, plus the lapse of time required for the patient to achieve victory in the fight against the tubercle bacillus.

What effects may be expected from the antipyretic drugs now at hand and daily prescribed for most patients?

Among these drugs, those now in widest use are antipyrin, cryogenin, maretin, etc. Their action is the same, although they act with relatively different power in different cases, and are also differently borne according to the

individual. Antipyrin is the best known of these drugs, but in France at least, cryogenin seems to have gained preference at the present time.

All these drugs possess the property of preventing the temperature from rising if given at the start of a fever wave, and of forcing down the temperature if the fever wave is already advanced at the time of administration.

If the drug is given in sufficient dosage, the fever is completely aborted. At the expiration of half an hour, or sometimes more, the temperature falls to normal or even below normal, and in nine cases out of ten this fall is accompanied by sweating, variable in amount and at times highly distressing. Often this is the only unpleasant result noted, but often, likewise, there are other such results which render these drugs intolerable to the patient.

The reduction of temperature lasts for a period ranging from two to four or six hours, during which time the patient, if he is not in too bad a condition, may eat, rest, or carry out minor tasks better than at other times.

This is in itself very gratifying, but unfortunately, it does not last. Soon the malaise of fever returns, often with an actual chill, the temperature reascends, and the fever curve is completely restored as if nothing had been done at all.

This second access of fever can, to be sure, be subdued like the first. But the fever will nevertheless certainly return—later, during the night.

Next morning, the patient will, as a rule, fail to show his customary drop in temperature at that time.

If one continues thus to combat the fever waves for several days with full doses of antipyrin, the patient's febrile condition will be so completely altered and dissociated as to be in all respects unrecognizable.

The harmful result of this procedure is that the patient, who would otherwise have had a good rise of temperature between 2 and 7 or 8 P.M. and who would generally not have developed a sweat because he would have been under fresh air treatment until 10 P.M. and even thereafter have slept practically out of doors, will experience in the course of twenty-four hours two or three very uncomfortable sweats and will have lost the quite appreciable benefit from his natural, drugless period of apyrexia, *viz.*, from 8 or 9 P.M. until 11 A.M., noon, or 1 P.M. of the following day.

This is what generally takes place in consumptives who have high fever in the early evening and in the morning are free of temperature or barely subfebrile.

Accordingly we believe it best, as a rule, to let the tuberculous patient quietly go through his fever wave, the temperature ascending every afternoon between 3 and 7 o'clock to 38°, 38.4°, 39°, and even 39.5° C. (100.4°, 101.1°, 102.2°, and 103.1° F.) but being normal in the morning. Under these conditions, indeed, there are about twelve hours out of the twenty-four in which he is not "burning up." Such cases are very common. Patients of this type, placed on the open air and rest treatment, are soon no longer particularly disturbed by the fever, and if necessary they simply take their supper one hour later than the rest of the patients. Very many, furthermore, take their evening meal perfectly well with an axillary temperature of 38° C. (100.4° F.).

Indeed, one not rarely meets with patients who, showing high fever in the afternoon and apyrexia in the morning, eat little or nothing at noon, when their temperature is 37° C. (98.6° F.), while on the contrary, they literally stuff themselves at supper, when the thermometer shows 39°, 39.5°, or even 40° C. (102.2°, 103.1°, or 104° F.).

What has just been said with regard to the patients with high vesperal fever naturally implies that we counsel even greater forbearance in the use of drugs in patients with but slight evening rises of temperature. Whatever may be the temperature shown at 3, 4, or 5 o'clock by a patient who at 6.30 or 7 o'clock will show only 37° or 37.2° C. (98.6° or 99° F.), we leave his fever alone.

This is done for the following reasons: The tuberculous subject who, even with marked lung lesions, shows but little rise in temperature, will get rid of this fever rather quickly under the air and rest treatment. Again, the patient who harbors lesions of rather restricted size, but the activity of which is manifested in a marked febrile attack every evening, very often presents a favorable prognosis. He is very likely, in the long run, to overcome his fever under the influence of the air and rest treatment and the free taking of food which is consequent upon it. In such a case, everything must be sacrificed to improve the nutritive status. If, consequently, it is possible for him to take his supper during his evening fever, he should be allowed to do so.

On general principles, then, I am not in favor of giving antipyretics in these cases.

This conclusion was reached as a result of prolonged experience. I do not, however, advocate complete disuse of these drugs in all cases. We sometimes prescribe antipyrin and its allies for special indications; but the intensity of the febrile movement is not then taken as guide.

Patients are sometimes encountered who, even under the fresh air treatment, do not take food in the evening because their fever makes them too uncomfortable. To these we give an antipyretic. If it is well borne, *i.e.*, if it does not make them any more uncomfortable than the fever

itself, so much the better. This, however, generally lasts but a short time. Either the patient finds the drug disturbing at night and himself requests that it be discontinued, or in the meantime the air treatment gets in its effect and the drug becomes unnecessary.

We also prescribe the antipyretics for patients whose fever comes on at an unusual, inconvenient hour of the day. Thus, a patient with little or no fever in the morning, instead of having his rise of temperature between 3 and 6 o'clock, may suddenly find it coming on at about 11 A.M. or noon, when he is about to sit down at the table. According to my observations, these displaced febrile movements are generally heralded by an unpleasant sensation of chilliness; they are usually not intense as regards elevation of temperature, but the discomfort they cause makes it difficult or impossible for the patient to take his meal, and the succeeding hours are equally distressing.

In such cases, a medium-sized dose of antipyrin or cryogenin, taken half an hour before the chill, cuts short the movement and all its consequences. And as if this type of fever really were of an unusual order, it seldom reappears in the afternoon. The patient eats his lunch in comfort and having returned to the outdoor cure, retains a temperature of 36.5°, 37.3°, or 37.6° C. (97.7°, 99.3°, or 99.7° F.) the entire evening.

Another indication for drugs occurs in certain patients who are highly distressed by even moderate fever, some because of a feeling of weight in the head or neuralgic state, and others through a species of enervating effect. Antipyrin or its congeners diminish or even completely remove these uncomfortable accompaniments of the rise in temperature.

It should be carefully kept in mind, however, that in order to secure the complete benefit of the remedy in these cases without its unpleasant side-effects, it must be given at the time when the febrile movement is supposed about to begin and not when the patient is already aware of its presence.

According to all the facts above presented, when one thinks it necessary to give a tuberculous subject with fever an antipyretic of the type of antipyrin or cryogenin, the aim sought should be, not to break the fever, but to make the attack bearable to the patient by eliminating as much as possible its discomforts, which have already been wearing him down for a more or less prolonged period, and especially, are preventing him from taking food. One must avoid, however, replacing the one form of discomfort by another, *viz.*, by a sweat, which is at least as distressing as the fever.

The dose of the drug therefore, must be small. One should grope about and seek that dose which will relieve the patient without bringing on sweating. Thus, one may find it feasible to prescribe only 0.15 or even 0.10 gram of cryogenin with real benefit, even though 0.20 or 0.25 gram had already been found to exert a relatively disadvantageous effect. When once the appropriate dose for the individual case has been ascertained, it can be kept up for a considerable time with continued benefit.

This is just as true of the common vesperal fever as it is of the unusual noon fever.

Thus it will be seen that as regards the antipyretics, as well as in the case of the so-called specific remedies, I am neither wholly for nor against the measures. Observation has shown that there is advantage in abstaining from them, in general, in a host of cases in which they are ordinarily

prescribed; but I also clearly recognize their beneficial effects, and make use of them, under certain special circumstances.

If we now turn our attention to the *continuous,* or better, *remittent forms* of tuberculous fever, the situation becomes much more difficult; the same is true of cases in which there is a drop to nearly normal for only one or two hours in the morning, for the patient, fever setting in again already at 8 or 9 o'clock, derives almost no benefit from this brief remission; too often he experiences only its unpleasant accompaniment, *viz.*, sweating.

Under these circumstances, our decisions should be guided by the course of events. The fever being almost continuous, there need be no apprehension of trouble from displacing it. The patient must, above all, be relieved of the discomforts of his febrile state, and if he is not eating, artificial remissions of temperature be procured in order that he may take food more readily.

This chapter could not be properly concluded without mention of the rubbing of guaiacol into the skin as an antipyretic measure. Whatever may be the explanation of its action, it is perfectly clear that this procedure is capable of lowering the temperature. We have, of course, tried it, and consider its mode of action very similar to that of antipyrin. Its effect, however, is much less certain.

As with antipyrin, we observed that rubbing in guaiacol brought down the fever, but that the latter reappeared in at least as disturbing a fashion as before, a few hours later.

Granting that the effects of antipyrin and guaiacol are equivalent, it is clear that in patients with continuous high fever, the latter remedy may be frequently employed, under the conditions already described, in cases in which sparing of the patient's stomach is particularly necessary.

In leaving this subject and to place the reader on his guard once more against errors of interpretation in estimating the action of antipyretics, reference may be made to the following case, which concerns the rubbing in of guaiacol: A tuberculous patient with severe, bilateral pulmonary lesions and fever both morning and evening, was sent in for open air treatment as a last resort. The patient ate practically nothing, and the case seemed desperate. He was placed on very strict outdoor treatment and guaiacol was rubbed in daily. The effect of the guaiacol was very irregular; sometimes it acted and sometimes it did not, as the temperature chart showed. Discontinuance of the guaiacol from time to time resulted in reappearance of the obstinate tuberculous fever, which remained quite uninfluenced; the pulmonary lesions after the usual primary "cleaning up" effect from the air treatment, became absolutely stationary, and all the other constitutional signs likewise.

Improvement did not set in until after several months, when the patient became able to take 450 to 500 grams of raw meat a day. From that time on, there was positively a resurrection. He stopped losing weight, the urine cleared up, and the temperature descended, at first in the morning, in the fifth month temporarily to normal, and then continuously. From 38.5° to 39° C. or higher every evening, it went down to 37.2° or 37.5° C. The patient now rose from bed, to which he had been confined for months.

Here, then, was a patient who had been rubbed with guaiacol for a very long time. These rubbings were powerless to change in the least degree the course of the tuberculous fever up until the time when, thanks to the systematic hygienic treatment, the patient was enabled to take a satisfactory diet.

## CHAPTER VI.

### AUXILIARY TREATMENT IN TUBERCULOSIS.

THE essential conclusion from all the foregoing data is that the tuberculous patient who responds to the open air treatment is not in need of any drug treatment.

There exist, however, countless prescriptions or recommendations which, without in any way aiming to influence the cause of the disease, or even the pulmonary lesion itself, constitute a "hygienic" medication of tuberculous patients, forming part, as they do, of the hygienic method of treatment. They include what we may term the group of auxiliary medical measures. We shall take them up in a convenient order without following any special classification, but simply passing from one organ or structure of the body to the next.

#### I. Hygiene of the Skin.

The consumptive should maintain his skin functions up to the highest pitch of activity.

With this aim in view, the following measures are to be recommended:

**The Dry or Wet Rub.**—These rubs are appropriate for all patients, whether febrile or afebrile. They are carried out in the morning or in the evening, or both morning and evening, if necessary. In our institution, we employ only the morning friction. It should be carried out in bed, upon awaking, before breakfast.

The various articles used in carrying out the procedure need not be described. Most often, either the flannel tam-

pon or the woolen or horse-hair mit is employed. The patient is stripped and the rubber practises friction in a longitudinal direction over the entire trunk, neck, and arms down to the lower extremities, both anteriorly and posteriorly. The skin should be brought to a more or less pronounced blush. When the procedure is finished the patient puts on his flannel gown again, buries himself under the bed covers for five or ten minutes, and then takes his breakfast.

In the wet rub, any sort of a rough surfaced glove, more or less moistened with a somewhat irritant fluid such as pure or medicated alcohol, aromatic vinegar, a mixture of alcohol and turpentine, etc., may be used. We generally employ alcohol mixed with Cologne water and made aromatic with oil of lavender.

At first moist, the rubbing finally becomes dry through evaporation of the fluid from the skin and glove. The manner of procedure is the same as in the dry rub.

The effect of this measure, carried out in the morning, is to cause in the patient, returning under the bed covers for a few minutes, a mild reaction followed by a general sensation of well-being. He gets more thoroughly awakened and is prepared for taking his breakfast.

The *hardening rub* is carried out as follows: The patient is given alcohol rubs for a week; during the second week, the alcohol is diluted one-half with water, and later three-fourths, until finally he is receiving rubs with plain water. The usual reaction occurs, the patient having been thus gradually trained to it.

**Baths.**—Apart from special and rare contraindications, which the physician will have to seek in the individual case, tuberculous patients free of fever may be bathed without harm, and indeed, with advantage.

Some physicians and patients still harbor a prejudice against it, but we bathe all our afebrile cases, and have never observed any untoward consequences.

The bath should preferably be taken in the morning at about 10.30 or 11 o'clock, in the tub, and in a sufficiently warm room. It may be either plain or more or less medicated, according to individual preference and with the physician's approval. The temperature of the bath in winter should be 37° C. (98.6° F.). We recommend that its duration be ten minutes. After leaving the bath the patient is dried off and vigorously rubbed in his bath robe and, upon leaving the bathroom, should walk around a little before settling down. Under these conditions the bath is of excellent service.

**True Hydrotherapy.**—No special reference will be made to the hot or tepid shower limited to the lower extremities, which is employed to combat certain special disturbances.

As for the cold shower, hitherto little employed in France, our view is that, as a concrete measure in the hygienic treatment, its use should be limited to apparently cured tuberculous subjects for whom an energetic hardening process is desired. It should be borne in mind that even under these conditions the cold shower is a measure requiring some degree of care and experience in its application.

We employ more commonly the cold tub, in nearly all our cases. This is very easily carried out and is suitable for all tuberculous subjects free of morning fever. Used alike in summer and winter, it acts remarkably well as a hardening procedure.

On the evening before, water is allowed to run into the bowl so that next morning it will be at room temperature.

In cold weather it may be further warmed with a little hot water. Patients accustomed to the procedure, however, do not require this.

Upon awaking, the patient, still warm from his sleep, removes his night clothing and pulls the bed covers up over the bed to keep the latter from getting cold. Standing up in the tub, he takes a wet sponge in each hand and squeezes the water out over his shoulders, once anteriorly and again posteriorly. The water in the bowl having been used up, he leaves the tub, puts on his bath robe—provided with sleeves—without rubbing his body, merely dries his feet carefully with a towel, and gets back into the warm bed.

Rapid or even immediate reaction takes place, and five or ten minutes later he has merely to remove his robe and don his clothes for the day.

The reaction is sometimes so prompt that it takes place in the bath tub; some persons feel themselves increasingly reacting as they wring the cold water over their bodies. In fact, in winter the bodies of some patients literally give off vapor from the more or less icy water passing over them.

No harmful results attend the cold tub. At least we have never observed any. Certain precautions, however, are indicated. The physician should administer the first two or three tubs himself, testing out the sensitiveness of the patient with water slightly warmed on the first day, and passing to the use of cold water in the course of two or three days. He then has the patient take the tub himself in his presence.

Especially after the first tub the physician should remain a few moments at the bedside, watching the patient's pulse while he is reacting, and making certain that the reaction takes place satisfactorily.

It may happen that the patient has some heart deficiency, as described in a previous chapter, and in this event the first tub, even when administered by the physician himself with all necessary caution, may slightly "stun" the heart. As a rule, the patient is not conscious of it, but the disturbance is readily perceptible by palpation of the pulse. The physician already knowing that a patient has some trouble of this nature should watch him all the more closely. This stunning effect on the heart is, however, very evanescent; it lasts only a minute or two, while the patient is getting warmed up, and rarely recurs the next day.

The patient should be urged to dry his feet thoroughly before getting into bed. The feet are always the last part of the body to react. Proper drying of these members can hardly be secured otherwise than with a Turkish towel. While the patient is thus rubbing his feet thoroughly, reaction of the body in general is, as a rule, already taking place.

If, for some reason, often obscure, it should happen some morning that the patient is unable to react properly and feels that he is not getting dry, the best thing for him to do is to get out of bed, get dressed quickly and summarily, and take a walk, well covered. If necessary, some hot beverage may be administered. Such an occurrence, however, is quite exceptional, and in our institution is certainly not met with once in a year's time.

Many patients prefer not to return to bed after having taken the tub. This further simplifies the procedure. After their feet have been well rubbed and dried, these patients stand upright in their bath robes, dry themselves thoroughly in the armpits and between the thighs, and as the rest of the body is already dry, have nothing further to do but get dressed.

A few subjects have a genuine dread of cold water. These may be permitted to take a tub with tepid water, following the procedure already described. This can no longer, of course, be classed as a hardening procedure, but constitutes nevertheless a serviceable and pleasant hygienic and cleansing measure, appropriate in all seasons of the year.

Patients accustomed to the tub, being hardened to cold water, willingly continue the procedure even in winter.

In the summer time, on hot days, they find it pleasant and at the same time very useful in promoting sleep to take another cold tub in the evening before retiring.

*Cold Flagellation.*—This measure may be used for somewhat timid persons averse to the cold tub, being applied both as a hydrotherapeutic procedure and by way of preparation toward the cold tub. The patient, stripped to the waist, slaps his shoulders, arms, and chest with a towel dipped in cold water and quickly opened and exposed to the air for a short time. This induces a noteworthy rubefacient action, and the patient rapidly gets accustomed to it.

**Counterirritant Measures.**—This group of measures does not properly come under the heading of hygiene of the skin, since actual medicaments are used, but may nevertheless be referred to here for convenience.

Before the bacterial origin of phthisis was discovered, great stress was laid on perituberculous congestion of the lungs in the then prevailing theories concerning the induction of the disease. Accordingly, local counterirritation, which had always been widely used, came into great favor about half a century ago. Every known counterirritant was applied over the chests of the patients, including mainly various kinds of mustard applications, croton oil, tincture

of iodine, fly blisters, diffuse vesication, and the actual cautery.

Counterirritation is still considerably employed, and I have no intention of underestimating it. But I firmly believe that in this as in other matters, due distinctions should be made, and that these distinctions are by no means based simply on theory, but are justified by experience.

Where tuberculous lesions of the lungs, mild or severe, are actually in a chronic state, without neighborhood complications, it is hard to see just how superficial counterirritation could have any effect on the clinical course. As a matter of fact, in patients presenting these conditions, we have never observed the mustard applications, fly blisters, actual cautery, or tincture of iodine produce any change, favorable or unfavorable, in the clinical course of the lung lesions.

For a number of years, following the prevailing vogue and at the request of patients, we specifically did employ thousands of cauterizations of all sorts. As already stated, local effects on the disease were *nil.* At the same time, some consumptives did experience a certain sense of general improvement as a result of the measure. They claimed that breathing was rendered easier for twenty-four hours, and impatiently awaited the dropping off of the scabs so that they could have further cauterizations.

There is one condition in which cauterization does seem to be useful when carried out freely and frequently, *viz.,* where there are residual membranous pleuritic exudates, sometimes persisting a long time after the acute or subacute period of pleuropulmonary congestive attacks or pleuropneumonias with their bases at the pleural surface. Marked benefit generally follows their use in all such conditions.

The same, possibly psychic, effect appreciated by the tuberculous subject is sometimes likewise obtained with mustard applications and fly blisters. Some patients apply three or four mustard plasters every evening over the lung apexes, and get to be regular monomaniacs on the subject. Others become equally enthused over fly blisters.

Obviously there is no reason why any of these various favorite procedures should be interdicted since they give psychic satisfaction, exert somewhat of a soothing effect on certain patients, and at the worst could hardly do much harm.

Yet in this connection one slight restriction must be laid down.

Aside from the patients who derive no unpleasant mental impression from the actual cautery, a few exhibit after cauterization one of the two following untoward results.

On the evening of the day of cauterization, the temperature rises, sometimes to a considerable extent, and some develop an actual febrile attack persisting until the next morning.

Or, in the afternoon, evening, or night of the day of cauterization, the sputum may become more or less blood-streaked.

These effects are by no means rare, and we have never found them in any way alarming; but it is well to remember that they do occur, in order to obviate unnecessary apprehension.

Matters are entirely different in the case of a consumptive passing through a lung attack in which congestion seems to be playing an important rôle, whether the condition be a mere "stitch" with pleural radiation, as so frequently occurs in interlobar inflammatory exacerbations; whether it be a perituberculous hyperemia at the apexes or

elsewhere; a periembolic congestion; a congestion about a disease focus in an acute state of suppuration, or possibly the ordinary congestion resulting from exposure to warmth followed by cold, the downward progression of a cold from the upper respiratory passages, etc.

Under all these circumstances, counterirritation over the chest is entirely appropriate and, in fact, constitutes one of our major therapeutic resources.

The counterirritant most commonly employed is doubtless tincture of iodine with or without addition of guaiacol. There are no objections to it. It should here be recalled, however, that in certain patients tincture of iodine may, like the actual cautery—though much less commonly—induce an evening temperature reaction and cause blood to appear in the sputum.

There remains to be considered the still much discussed question of the permanent cautery or "issue," in high favor in the last century, at present much neglected, as are leeching and blood letting in general clinical medicine.

Here again, two alternative conditions may present themselves.

Many physicians have reported remarkable instances of consumptives cured or greatly improved by the induction of an "issue" over the main diseased area in the lung. Manifestly the issue was not alone operative, but it appears to have often acted well, and for my part, I know of instances in which I would unhesitatingly attribute to this measure a considerable share in bringing about recovery.

Where an issue is induced in a tuberculous patient of the average type, the old theory of *duobus laboribus*, etc., seems applicable to its action, *i.e.*, it appears to act by derivation. This is in accord with every day experience in general clinical medicine.

There occur, however, instances of another sort, related to what I have described under the term *tuberculous issues of the lung,* which may be summed up in a few words.

Some specially constituted tuberculous patients utilize their lung lesions as a permanently patent issue, ready to eliminate to the exterior through the bronchi the noxious materials burdening their tissues and circulating in the blood stream.

According to this conception, the primary therapeutic indication is naturally to attempt to alter the conditions of the patient's tissue fluids or humors. But there is also the additional indication of establishing over the chest a permanent cauterization or *counterissue,* acting in opposition to the tuberculous issue in the lung.

This is, perhaps, a return toward the humoral conceptions of former centuries, but I can definitely state that this procedure has given us excellent results, irrespective of all theoretical considerations.

**Skin Affections.**—Without intending to enumerate all skin diseases the consumptive subject may develop, it will nevertheless be useful to enumerate a few affections to which they are particularly subject. Indeed, I have often had occasion to convince myself that patients experience a certain sense of satisfaction, coupled with mental quietude, in knowing almost without being told that in the course of their illness they are exposed to certain definite skin disturbances which they know to be unattended with danger.

(*a*) Various forms of *acne,* the most serious being mortifying or necrotic acne (acne cachecticorum), a very common condition, at times covering the nuchal region and shoulders, down to a point below the scapulas. In treating this disfiguring disorder we employ early cauterization with the point of the actual cautery.

(*b*) The flat, yellowish patches of *pityriasis* (*tinea*) *versicolor,* accompanied by itching, located especially on the anterior aspect of the chest. This eruption many authors believe etiologically related to tuberculosis. It occurs especially in patients on heavy diets and among those with disturbances of gastric digestion. It should be treated locally with saponaceous lotions, measures being simultaneously taken to overcome the digestive disturbances.

(*c*) *Seborrhea circinata,* manifestly parasitic, occurring on the same regions of the body as tinea versicolor and, in my experience, amenable to the same treatment.

(*d*) *Keloids* or exaggerated cicatricial formations, which, aside from their frequent relationship to tuberculosis, are rather rebellious to treatment, whether medical or surgical.

(*e*) *Ichthyosis,* so frequent in consumptives that it is hard to consider it other than a skin lesion of bacillary origin, whether of the type of ichthyosis pilaris, often restricted to the scapula, deltoid, and post-brachial regions, or more widely diffused over the extremities and body; of the type of true ichthyosis, more or less scaly, dusty, and symmetrically localized or generalized, or consisting of any of the varieties of or intermediate forms between these two opposed types. Up to the present, these skin lesions, actual infirmities very often inherited, have seemed almost wholly refractory to our remedial measures.

(*f*) *Psoriasis,* or candle-grease spots, much less frequent than the preceding disorders, but nevertheless fairly common among consumptives. Of late years the view has been put forth, in the absence of other evident causal factors, that the disease might be of tuberculous origin. The treatment of psoriasis nonetheless remains a difficult matter, as in the past.

(*g*) ***Erythema nodosum,*** the great acute dermatitis of the tuberculous, the bacillary causation of which in the vast majority of cases seems to have been established. Often it is a warning eruption calling the physician's attention to the health deficiencies of a subject later to develop definite signs of tuberculosis. No specific treatment exists, but rather, certain indications which require to be met according to the individual case.

(*h*) ***Benign purpura,*** consisting of small hemorrhagic spots in the skin, rather frequently seen in consumptives and which a number of authors likewise regard as being of tuberculous nature.

(*i*) *Herpes zoster* (*zona*), an eruption in the form of patches of vesicles, the localization of which is essentially governed according to the areas of distribution of cutaneous nerves. It is common in tuberculosis, and is of tuberculous nature in the majority of instances, if not always. In nine cases out of ten, the only treatment applicable is to prevent rupture of the vesicles and cover the patches of eruption with bland powders.

(*j*) *Vitiligo,* or areas of depigmentation of the skin. It is likewise frequently met with among consumptives, and is possibly of tuberculous nature. There are no therapeutic indications.

(*k*) *Striæ* of the skin, occurring in many different forms, of which those of greatest interest are the characteristic dorsolumbar, horizontal striæ, perhaps due to a local disturbance caused by the tubercle bacillus. No treatment is required.

Tuberculous subjects develop many other skin disorders shown to be of specific origin and often preceding, as do erythema nodosum, purpura, and herpes zoster, the appearance of the pulmonary lesion. These disturbances, how-

ever, are much less common, as yet inadequately known and described, and are practically of interest only to the specialist in dermatology.

**Chilblains.**—Sanatorium treatment, involving almost constant exposure to the outdoor air, eminently favors the production of chilblains not only among persons already subject to them, but likewise among others whose former habits of life were altogether different. Due precautions being taken as regards footwear, the hands are more particularly to be thought of in this connection.

For established chilblains we have practically no effectual treatment, apart from measures to keep them from getting worse, cracking open, and ulcerating, which measures merge with the prophylactic treatment.

Following is what experience has taught us to be the simplest, most convenient way to manage these cases:

During weather tending to induce chilblains, the hands should be washed with soap but once daily before retiring, unless it is absolutely necessary to wash them more often. The hands are well rinsed and dried. When getting into bed, the patient rubs his hands all over with a little plain vaseline, and slips on a pair of kid gloves of large size for the night. In the morning, the hands may be rubbed with a dry towel and even washed with warm water.

No soap should be used. The hands are to be washed with warm water and cleansed with a brush while under water. Such cleansing is at least equivalent to that obtained with soap.

Finally, at all times except when eating his meals, the patient should wear continuously an extra large pair of gloves.

The reasons for this mode of procedure are these:

"Chapping" nearly always results from removal of the fats from the skin by the soap and exposure to cold of the imperfectly dried hands.

If, to render the skin unctuous, glycerin is used, as is too often the case, the glycerin, which is very soluble in water, is dissolved off when the hands are next washed, leaving the skin highly vulnerable to the soap and even to plain water. Vaseline, on the other hand, being insoluble in water, remains in the outer layers of the epidermis and keeps them from being defatted, except upon free use of soaps. Indeed, the skin when treated with vaseline withstands repeated brushings under warm water very well.

To be sure, wearing gloves throughout the day is a nuisance; but it is better than having painful and even dangerous fissures in the skin.

**Alopecia.**—As in all infectious diseases which exert a profound reaction upon the system, loss of a considerable portion of the hair is frequently witnessed in tuberculosis. This may either be permanent or, more often, occur at intervals in conjunction with exacerbations of the tuberculous disease. At such times, patients can often pull their hair out in handfuls.

As a general rule, aside from tuberculous subjects in pronounced cachexia, the hair grows back rapidly after the acute attack is passed. It remains, however, a source of anxiety, especially among women or young girls, who are distressed at the prospect of possibly losing their hairy adornment.

Our object should be, therefore, to give them the mental satisfaction of showing that we can, by appropriate therapeutic means, assist in the restoration of the hair. Remedies for this purpose are not lacking. But where the condition of the scalp does not *per se* afford any additional

indication, where partial alopecia appears to be alone responsible, pilocarpine is the agent to be used. Combinations including it are numerous and varied. Following is the one I have been using for over thirty years and which has given unquestionable results:

℞ *Aquæ coloniensis* ..... 150 Gm. (5 ounces).
*Tincturæ cantharidis* ..... 8 Gm. (2 drams).
*Glycerini puri* ..... 2 Gm. (½ dram).
*Pilocarpinæ nitratis* ..... 0.8 Gm. (12 grains)—M.

A toothbrush is slightly moistened with this solution and the roots of the hair over a surface of the size of the palm brushed over with it each day, the entire scalp being thus gone over in a week's time.

### II. Hygiene of the Digestive Tract.

This section is intended to cover, not the therapeutic indications existing in various forms of gastric disorder, impaired secretion, etc., but the various objects to be sought in order to favor proper functioning of the stomach and intestine among tuberculous patients in general.

**Mastication. Fluid Intake.**—No stress need here be laid on the obvious necessity of properly masticating the food, nor on the well-known fact that digestive disturbances often result from a poor condition of the teeth. The dentist should remedy this insofar as is practicable, or if proper measures in this direction cannot be carried out, the food should be taken in a finely divided form, or better, a mechanical masticating device used.

As we have already seen, it is not advisable for the tuberculous subject who is eating heartily to take very much fluid at meal times, and many patients suffering from digestive disturbances find it best to use nothing but water,

the congestive state which is otherwise apt to follow the meals being thus obviated.

On the other hand, there is no objection, in the case of some tuberculous patients, unless special restrictions by the physician are in order, to the taking of a cup of tea or camomile tea once a day. Hot infusions, used in small amounts, tend to accelerate digestion. In this connection I would particularly recommend at the close of a meal the drinking of a cup of hot infusion made from orange marmalade, such as the Dundee marmalade used in England.

A highly annoying occurrence, which unfortunately often keeps the patient, his family, and the physician "on edge," is vomiting after a meal, whether apparently due simply to rebellion of the stomach, with nausea, or, as is more generally the case, apparently due to the so-called *emetic cough,* in which event it constitutes an essentially mechanical act of vomiting. As a matter of fact, the cough is itself nearly always induced by some form of gastric discomfort after the close of the meal.

The treatment in such cases, then, should not, as a rule, be directed toward overcoming the cough, but rather against the gastric symptoms, *viz.,* the disturbing sensations in the stomach.

The first requirement is to reduce the amount of food taken at the meal to a minimum; and the best means of securing this is to forbid all drinking of fluids at the table.

In general, though unfortunately not always, prompt results are thus obtained. This is accounted for by the ease with which the gastric musculature is able to triturate the food material and the readiness with which the latter can be digested from the sole fact of having been masticated and moistened with saliva before deglutition. The saliva, as is well known, is an essential factor in intragas-

tric digestion, while any other fluid taken in through the mouth is generally considered rather a hindrance than a help in this direction. Man is probably the only animal that drinks fluid during the process of taking food.

The question of alcohol in its various forms is deserving of somewhat detailed consideration.

Patients undergoing the treatment in very cold or frequently damp and misty climates, as in some high mountainous regions and in northern resorts at a low elevation, sometimes get in the habit of taking alcohol, occasionally in a fairly large amount repeated several times a day, either pure or diluted with water or milk.

In certain countries this was formerly a rather widespread custom, and the patients always carried about with them a special flask containing a drink of strong liquor.

It may be conceded that in very cold districts, where the patient sits for long periods on the veranda, often with the temperature at 10° or 15° below zero C. (+14° or 5° F.), he feels the need of taking some comforting drink, especially at the time when the sun is disappearing below the horizon. Nevertheless, it is highly desirable even in these special climates that the use of alcohol be strictly regulated by the physician himself and not according to the whims of the patient.

In sanatoriums at less elevations, situated in districts receiving but little direct sunlight in winter, and more or less murky and humid, alcohol taken pure or mixed with milk serves to a certain extent the same purpose as do fats among the dwellers in circumpolar regions. Yet it is doubtless by no means to be recommended as a generally useful measure.

In more temperate climates, in sunnier and drier localities, tuberculous patients are not at all in permanent need

of this auxiliary substance. Never, since I have had consumptive patients under my charge, have I ordered alcohol as a continuous measure of treatment.

During the digestive period, in tuberculous patients just as among persons in good health, there is no fixed rule as regards prescribing exercise or rest during treatment. Most patients find it helpful to take a short walk after leaving the table, but, on the other hand, there are always some who digest better while in a recumbent or semirecumbent position.

**Smoking.**—Should consumptives be allowed or forbidden to smoke? Here, again, there is no fixed rule. Obviously, this rather diverting habit cannot exert any unfavorable influence in pulmonary tuberculosis if it is indulged in only in moderation and the smoke is neither swallowed nor inhaled. Aside from the abuse of tobacco, the only objection to its moderate use is the irritating effect of the smoke in the upper respiratory passages.

Here are our recommendations in this connection: We permit the use of tobacco by patients who are able to smoke without coughing, provided they smoke only after eating, do not inhale, and discharge the smoke into the open air or in a room with the windows widely open. No distinctions are made as between cigars, cigarettes, or the pipe.

Tobacco is strictly interdicted to those who have never been able to smoke without coughing and those with irritative pharyngitis or laryngitis, whether pronounced or mild.

Finally, in some individuals tobacco causes an actual state of intoxication, like opium or morphine. Among the manifestations of this form of poisoning, the most striking and serious is anorexia, entire loss of appetite, ultimately with complete inability to take food. These patients take fluids, being constantly thirsty, but do not eat.

The only remedy is complete withdrawal of tobacco, and not merely a reduction in the amount used. Indeed, the same condition often prevails in these cases as is met with in connection with opium in persons whose systems are saturated with it. The toxic state is maintained even by minimal amounts of the poison.

Lastly, there is one group of tuberculous cases in whom the use of tobacco must be absolutely forbidden. These are the patients with sensitive hearts. Whether they be suffering from organic heart disease or merely from one of the so-called "functional" heart disturbances, if the use of tobacco gives rise to the characteristic subjective sensations or the objective manifestations with which all physicians are familiar, they must discontinue its use.

**Intestinal Functions.**—As regards the bowel functions, conditions among the tuberculous are the same as those met with among the well. Some defecate without difficulty and regularly, others are habitually constipated; yet in both groups are to be found persons who get along in excellent fashion.

As the tuberculous patient must absorb as much of his food as possible, a slight degree of constipation is not detrimental to him. The patient who digests well should go to stool every day and have formed feces. This is the best indication of satisfactory intestinal absorption.

The patient whose daily stool exhibits more or less of the consistency of a purée seldom shows a regular gain in weight. Furthermore, a patient who has diarrhea every day or passes merely two or three semiliquid stools is even less likely to secure good results as regards bodily nutrition.

Obstinate constipation, which is of special significance from the standpoint of hygienic treatment, also has its drawbacks, and must be corrected.

The laity, and particularly women, are not sufficiently familiar with the fact that, in nine cases out of ten, in order to obtain a daily bowel movement, the will to do so is sufficient. The patient who is willing every morning to devote fifteen minutes of his time to the exclusive purpose of securing a bowel movement will be quite surprised to find after a few days that he is getting the desired result.

Two factors are involved in defecation. In the first place, there is the natural desire to defecate which is brought to the patient's attention at varying intervals; secondly, there is the brain's command to expel, which is carried down to the intestine. This command, a manifestation of the will, the majority of constipated persons have lost the habit of issuing. They have become accustomed to replying to the natural desire by a command in the reverse or opposite sense, especially among women. It is by such a procedure that certain lady patients, who eat sparingly, have bowel movements only 52 times a year. It is this ability to initiate expulsion that they must reacquire by an act of will power or sustained attention.

Sometimes it is of advantage to assist artificially this daily, matutinal function. Drinking water with the meals is often of service. Another simple but effectual measure is to insert a plain cocoa butter suppository every evening.

Persons with really refractory constipation are generally found provided with a small arsenal of laxative remedies, old and new, to which they are, of course, accustomed and which they are obliged to use alternately as the effects constantly wear off. Too often, when the drugs used are powerful ones, these patients experience only the unpleasant effects without securing the desired action.

Where a patient is compelled to use these agents, the least irritating ones should be sought, but two or three must

be selected to permit of alternation. There is one, however, which we particularly recommend to our constipated consumptives, namely, the ordinary compound licorice powder, composed of equal parts of powdered licorice, washed sulphur, cream of tartar, and calcined magnesia. This preparation is absolutely harmless, and when taken with the evening meal in the dose of one full teaspoonful, or more if necessary, seldom fails to act favorably even where all varieties of pills and tablets have practically lost their effects.

Indeed, where one is obliged to keep at hand several drugs and use them alternately to assist the bowel functions, the most harmless agents should be selected.

While tuberculous subjects do well to have firm stools, retention of fecal material and the amount of effort required to expel it may be attended with considerable disadvantage. Aside from the fact that difficulty at stool may induce blood-spitting, these patients often suffer with hemorrhoids, and should seek through painstaking local cleanliness and regular bowel action to forestall the inflammatory complications so common in this disorder. Again, not a few individuals with obstinate constipation go to stool regularly as soon as they begin to eat larger amounts of food.

Laymen seldom realize the serious disadvantages, or even dangers, attending inveterate constipation. Among the tuberculous as elsewhere, there often result headaches, migraine, gastric disturbances, sensations of weight, pain, flatulence, malodorous breath, loss of appetite, more or less persistent nausea, and subsequently abdominal disorder, colic, borborygmi, lumbar pain, and griping, the latter more pronounced at the menstrual periods. A special manifestation in lung cases, however, is the reaction of the

stercoral intoxication upon the affected pulmonary tissues and upon the circulation and nervous system.

I have repeatedly described elsewhere the unfavorable reactive effects upon the lungs which constitute a most serious disadvantage of constipation, but it may not be amiss to refer to the subject again.

There are some patients, male or female, especially the latter, who, harboring pulmonary lesions in an advanced stage of recovery, are unable to complete the closure of these lesions from the mere fact that they are constipated, even though their complete freedom from fever during many months has shown all active tuberculous disease to have disappeared. I could cite remarkable examples of patients with very discrete apical lesions who, after having been treated for more or less marked bronchitis, with or without asthma, for months or even several years, recovered in a week from all these disturbances from the sole fact of having re-educated their bowel function. The important thing is that the existence of this state of affairs in the individual case should be recognized. After apparent recovery from their disease, these patients of course retain their pulmonary lesions, but in a sluggish or even "dry" form, requiring nothing more than an intelligently applied hygienic treatment to obtain a definite cure.

These reactive phenomena in the lung, as I likewise pointed out, may occur in an acute form as a result of quite a number of the intestinal disturbances which undermine the resisting powers of consumptives. All this is related to the question of tuberculous "issues" from the lungs. I shall limit myself here to pointing out the rather large number of tuberculous patients who owe to regulation of their bowel function the disappearance of cardiac and nervous disturbances so intense and lasting as to have rendered their

lives an affliction, and which dissuaded them completely from the purpose of making an attempt to get cured of their lung condition.

**Oral Hygiene.**—Proper hygiene of the mouth and pharynx is no less advantageous. The mouth should be kept in a condition of strictest cleanliness. This is, of course, a fundamental requirement among the well. It is at least as important among the tuberculous. Indeed, it is in the mouth and pharynx, as well as in the nasal cavities, that the various infectious agencies suspended in the external air reside after having been more or less completely arrested in their downward progress. Various putrefactive processes due to the presence of the oral and pharyngeal mucous discharges, not to mention the food débris which assist in the process, tend to occur in the oral cavity.

Patients should therefore take particular care of their mouths. Cleansing the teeth morning and evening, or at least every evening, is a normal procedure, but the tuberculous patient should in addition, after every meal, and likewise between meals if, *e.g.*, he takes milk, rinse out his mouth well and gargle in order to remove food débris. This is of particular importance in patients on a milk diet. Milk remaining in the mouth seems to ferment at once, and an aversion to it soon results.

Nothing is better or simpler, to my knowledge, for this species of toilet of the mouth and pharynx than the use of one of the strongly alkaline waters, such as Vichy, Vals, or LeBoulou.

Nearly all consumptives show some degree of chronic pharyngitis. Aside from acute attacks which require appropriate treatment, it is advisable, when these pharyngeal symptoms become annoying, either constantly or intermittently, to have the patients gargle several times each day.

Borate and chlorate solutions are alike well suited for the purpose.

Not infrequently we teach some of our tuberculous patients how to apply a suitable solution to their own pharynx with the brush.

**Congestion of the Pharynx.**—Aside from the ordinary variety of pharyngitis which is so common in consumptives, reference may also be made to the permanently congested condition of the throat met with in the individuals termed in a previous chapter *angioneurotics.* This condition accompanies a general congestion of the skin, with particular redness of the face and ears and a purplish or violet color of the hands, the palms of which nearly always show excessive sweat secretion. This congestive angina, in which the mucous membrane of the pharynx and soft palate is often of a purplish tint, and swollen as though edematous, seems to appear in the tuberculous subject in adolescence and persist throughout life.

Upon it are superimposed intense, acute attacks lasting several weeks; and if the effect of tobacco on the membranes coexists, as is often the case, the condition constitutes an actual infirmity against which no remedy, to my knowledge, is of any particular avail. A large number of so-called arthritic individuals, suffering from this form of pharyngitis, visit various thermal resorts yielding sulphurous or arsenical waters, and not infrequently derive more or less benefit, which lasts for a variable period of time.

It should be noted that this condition of the pharynx, persisting after the exacerbations of activity of pulmonary tuberculosis have been recovered from, is directly dependent upon the constitution of the patient and is hardly amenable to improvement except through strict and correctly applied hygienic measures.

**Appendicitis.**—Appendicitis among the tuberculous is deserving of special mention, and its importance may be estimated from the considerable number of contributions regarding it that have been appearing in recent years, alike from medical and surgical authorities.

Taking the term appendicitis in its broadest sense, *i.e.*, including both its acute and chronic forms, there is no doubt that the disorder is very common in tuberculosis. According to certain observations that I have been recording for some years, at least one half of our sanatorium patients are suffering or have suffered from appendiceal trouble, and not a few of these have already been operated. It is not the acute, severe attack, often compelling the surgeon to act, which is of greatest significance among the tuberculous, but the chronic disorder, often dating back to childhood, with alternative stages of quiescence and activity, becoming lighted up again from time to time—with or without apparent cause—as is the case with practically all disturbances related to tuberculosis. Yet the sharp, acute attack, with more or less imminent necessity of surgical intervention, is by no means to be excluded from the clinical picture of this disease.

The condition then, is generally of the chronic type. During its phases of quiescence, discernible only when it is specifically sought, it may well be said to constitute a state of "appendicular distress" to which the term *appendicism* is applicable; and since this condition of distress is actually peculiar to tuberculous cases, I have described it, furthermore, as *tuberculous appendicism.*

In childhood this disturbance is manifest either as a chronic condition from the start, or as one which becomes chronic after light acute or subacute attacks, too often treated as attacks of acute enteritis or gastrointestinal dis-

order, with or without jaundice. When a child develops jaundice, his appendix should always be examined.

When chronic from the start, the condition present is "appendicular distress" with its misleading reflex effects, its neighborhood reactions, and too often, with its toxic manifestations. These children have no appetite, are sluggish in all respects, are constantly becoming nauseated, vomit on the least provocation, take an aversion to things almost without reason, and fail to develop either in girth or stature, except in instances of pathological growth. They are lacking in color, and their delicate appearance naturally results in their being spoiled and fed improperly, generally with food unsuited to their needs; in spite of all attempts to regulate the bowels, one is seldom successful in inducing normal and regular movements. Some show an inveterate constipation, oftentimes unamenable to laxative drugs, enemas, intestinal irrigations, or journeys to such resorts as Châtelguyon, etc. Others suffer unaccountably from alternating constipation and diarrhea. Others still have constantly upset bowels, with unusually soft or completely diarrheic stools.

Often these children complain, without much attention being paid to it, of sudden pains or lancinations, either in the inguinal region; the hip; lower, in the thigh; higher up, in the kidney region, posteriorly; in the region of the hilum of the liver and the pyloric area, anteriorly, or still further along the colonic arch, down to the iliac sigmoid.

This condition persists for years. Finally an attack comes on, more acute, of the type of an acute gastric or gastrointestinal upset, with or without jaundice; more simply, in the form of a catarrhal jaundice without predominating gastric or intestinal accompaniment; or, in the form of an enteritis, acute or subacute enterocolitis, with

maximal pain over the iliac colon, etc. Clearly, since the symptoms are so distinct in the region of the right iliac fossa, there need be no hesitation in the diagnosis; the disturbance must be an attack of appendicitis. But in cases belonging to the other types, how many of these attacks remain undiagnosticated!

And by the same token, how many children continue with their "appendicism" up to adolescence without its presence having been suspected.

This picture of tuberculous appendicism has purposely been drawn in a rather somber shade because the condition thus described is that which actually exists in a majority of the cases. It should be added, however, that some children show less symptomatic evidence of their condition of appendicular distress, and that the physician must really examine for it to find it. These children appear to be practically normal, they develop about as usual, eat satisfactorily, have no pain, and exhibit a fairly good complexion; like the rest, however, they are subject to the various appendicular manifestations already enumerated.

In all of these patients, I may add, with rare exceptions, careful examination discloses the tuberculous taint.

It is under these circumstances that an appendiceal attack, generally of rather subacute or sluggish type, may initiate the clinical condition certain careful observers have described under the term *appendicitis simulating pulmonary tuberculosis.*

The essential features of such cases are as follows: Illness sets in in an adolescent or adult. Its seat of origin is not clear. Lung symptoms appear, oftener at the apexes, but also sometimes lower down in the chest. A fixed idea is conceived that the illness is an attack of tuberculosis. Soon, however, certain indications direct attention to the

abdomen, and the fact is discovered that the condition is really an attack of appendicitis. Thereafter one of two things happens. Either spontaneous recovery occurs, and at the same time the pulmonary signs which had led to the apprehension of tuberculosis disappear; or, one is led to remove the appendix, and the apparent lung disturbance likewise disappears.

There can be no question as to the occurrence of this confusing condition. Its interpretation, however, is open to discussion.

Are we to conclude, from the fact that the adventitious pulmonary sounds disappear upon cessation of the appendicular disturbance, that appendicitis was simulating tuberculosis? Are we to conclude that the lungs were free of tuberculous disease? I do not believe so.

In the first place, I have personally seen quite a number of these cases, and I have always found tuberculous disease present in the lungs.

As for my own interpretation of "appendicitis simulating tuberculosis," it is based entirely upon the conception of the reactions of infectious, inflammatory origin upon a weak point, or *locus minoris resistentiæ*, of the organism, *i.e.*, in the cases now under consideration, upon the lung tissues already impaired through pre-existing disease.

Let us take, for example, a subject harboring in his apexes latent, torpid stigmata of bacillosis which mark, in a general way, what is now being too freely termed "pre-tuberculosis." This patient has at least a 50 per cent. chance of having appendicular distress. In a word, he harbors an unrecognized pulmonary bacillosis and a likewise unrecognized appendiceal disturbance. Let a subacute or acute attack of appendicitis appear. At once, the intoxication of intestinal origin reacts upon the pulmonary lesions

and brings to light subjectively and objectively these lesions, which for a long period had not been yielding any signs perceptible on superficial examination, and the existence of which, in most instances, was hardly suspected. As long as the intestinal attack lasts, the pulmonary attack likewise persists. This is the same sort of thing as occurs in the menstrual reaction taking place in the lungs in women with unrecognized tuberculosis. As long as the menstrual poison remains in circulation, it thrusts itself upon the tuberculous foci, even if they be of the most sluggish type.

When an appendicular attack simulating tuberculosis is recovered from spontaneously or as a result of operative intervention, the intoxication ceases, and the pulmonary lesion returns to its former latent state.

If, however, this lesion is then sought for by careful examination, the chances are good that it will be found.

Thus it will be seen that intimate relations exist between appendicitis in general and pulmonary tuberculosis. For my part, I am convinced that the chronic appendicitis of tuberculous cases is nearly always of bacillary origin. This does not exclude, however, the fact that a consumptive may suffer from an appendicitis arising from any one of the other known causes of this disorder.

Even aside from what has already been said, the importance of appendicitis in tuberculosis is very great. It must be recognized that the appendicism of children often results in a complete arrest of development. The therapeutic indication dependent upon this fact is clear. When, in the physician's judgment, the life of a child or adolescent is being compromised by reason of his appendicular distress, operation must be resorted to without waiting for the more threatening warnings which are given later by acute attacks.

On the other hand, if, in a recognized case of tuberculosis, the gastrointestinal disturbances of chronic appendicitis constitute an obstacle to recovery from the pulmonary lesions, the appendix must be removed as soon as possible.

The only possible argument against this mode of procedure would be, in the first place, that there are to be found individuals, tuberculous all their lives, who suffer from mild or severe appendiceal disturbances throughout life and have never been operated upon, and in the second place, that some patients who have suffered from an appendiceal disturbance apparently such as would prevent recovery from their pulmonary condition have, nevertheless, recovered.

These are fortunate exceptions, that is all; and one must never count on exceptions.

Unfortunately the physicians who, like myself, believe in removal of the appendix in a considerable number of tuberculous cases—recognized and treated as such—who are not in a stage so advanced as to compromise success, cannot always find the surgeon who will make up his mind to operate. This conservatism is too often ascribable to the long prevalent disinclination to operate in consumptives for any condition whatsoever. And yet how many operations have actually been performed on them, without the least thought on the matter, when their tuberculosis was not yet so advanced as to be universally apparent. Happily these old prejudices have now been laid aside.

I have had operations performed on quite a number of these consumptives who had been losing ground because of digestive disturbances clearly referable to the appendix, and have had nothing but favorable results from the procedure. Some years ago, it was still not infrequently diffi-

cult to convince the patient and his family of the necessity of an operation. But at the present time it has become usually an easy matter. When once a conviction has been formed in the physician's mind, he must not vacillate further and waste time, even if only for the following reason:

In the majority of instances, what is termed chronic appendicitis in the tuberculous forms the starting-point of more serious disorders in the large intestine. In order to forestall, if possible, this eventuality, the appendix should be taken out in good time.

**Obscure Digestive Disturbances.**—Finally, mention may be made of certain abdominal disturbances with which one should be familiar in order to plan a proper hygiene of the digestive functions. These disturbances may be divided into two groups, *viz.*, pseudodyspepsia and pseudoenteritis of tuberculous subjects.

That patients with lung trouble may suffer from digestive troubles of one form or another from a number of different causes is an undeniable fact. Not infrequently, however, the condition is not a true dyspepsia or enteritis, for the disturbance is much more readily relieved by means of suitable verbal counsel for the correction of disordered function than by the administration of the so-called antidyspeptic drugs.

**A. Pseudodyspepsia.**

1. *Pseudodyspepsia Due to Exogenous Intoxication.*—Poisons introduced into the body from the exterior are frequently a cause of digestive difficulties among the tuberculous. The usual agents in this connection are tobacco, coffee, opium, and morphine; others are much less often operative. It is a fact that most of these poisoned individuals are apeptic rather than dyspeptic, for as a rule the upper digestive organs are in a dry condition, excess of

salivary secretion being only occasionally present. Whatever the condition may actually be, these patients are unable to digest properly even the small amounts of food they succeed in taking. Complete removal of the cause is, moreover, often difficult to secure.

2. *Pseudodyspepsia Due to Excessive Medication.*—Some consumptives, dwelling in what may be termed a medico-pharmaceutic environment, are so abundantly provided with prescriptions and wholesome recommendations of various sorts, all carried into effect simultaneously, that they are unable to have a single complete hour's rest during the day or night, being almost continuously eating, drinking, or awake in order to take some particular medicine. Finally, their digestive tract rebels, dyspepsia sets in, and they become intolerant of all ingesta. In these cases the treatment is in itself easy and simple, but the physician may experience some difficulty in having his wishes in the matter actually carried out.

3. *Pseudodyspepsia Due to Overeating.*—A true dyspepsia is sometimes met with from this cause among the tuberculous. Some of these patients overtax their digestive functions by eating too much and too often of the ordinary kinds of food; others do so by eating, in addition, the foods constituting the so-called supplementary diet. There are also a few who, while already absorbing an amply sufficient diet, make it a point to ingest large amounts of codliver oil —an excellent nutritive product which, however, is in general very badly borne by heavy eaters.

4. *Pseudodyspepsia Due to Stercoral Intoxication.*—In a number of patients suffering from pronounced constipation, the condition reacts, or at least apparently reacts, upon the stomach. These are chronic tuberculous patients, generally without fever, who, all question of the existence of

appendicitis having been eliminated, are treated for apepsia and dyspepsia precisely as are the patients poisoned by tobacco or opium, and who recover from their digestive disorders within a week after their constipation has been successfully combated.

5. *Pseudodyspepsia in Patients with Dental Deficiency.*—When the treatment of a case of tuberculosis is undertaken one should never forget to examine the teeth. The nature of the corrective measures required is self-evident, but proper execution of these measures is not always readily secured. Restoration of the mouth to the condition necessary for proper mastication is obtained only at the cost of repeated suffering. Much time is always required for adaptation of the mouth to artificial dentures, and in the interval conditions are hardly favorable for the taking of the necessary ample amounts of food.

6. *Pseudodyspepsia Due to Rapid Eating.*—All tuberculous subjects who are unable to masticate properly fall into this group. When the physician has ascertained by inspection that the patient's dental apparatus is adequate, he should likewise make sure that the patient knows how to use it and that he does use it. Often it is the persons naturally provided with excellent teeth who fail to masticate their food properly.

The patients really suffering from tachyphagia are those who, although possessed of sound teeth and an ample flow of saliva—like some carnivorous animals—deem it enough to sink their teeth once or twice into any solid article of food and then swallow it in large pieces. These individuals have instinctive confidence in their chewing apparatus and are convinced that such a minimal amount of mastication is sufficient. Besides, they drink much fluid at the table, and the combination of these two factors causes a slowing of

the digestive process which soon leads to prolonged food stasis and dilatation of the stomach. In these cases verbal directions must be given and stressed sufficiently to correct the patient's tachyphagia and polydipsia.

Some other patients fail to masticate because the very thought that they must masticate is distasteful to them. Consequently their flow of saliva is deficient and they drink fluid with each mouthful of food in order to wash it down. The resulting effects on the stomach are the same as in the preceding group of cases.

7. *Pseudodyspepsia Due to an Insufficient Food Intake.*—Bradyphagia is an excellent thing in the peasant who eats and masticates throughout the hour or more he spends at the table; under such circumstances it fails to induce dyspepsia. In some cases, however, bradyphagia is due to lack of appetite, whether the cause of the latter resides in the disease itself, with or without fever, or consists of some external toxic factor, *e.g.*, tobacco, coffee, opium, etc. These patients experience trouble in masticating, insalivating, and swallowing, and this difficulty may increase to the point of absolute impossibility. In such a case, the patient takes food into his mouth, turns it over and over, chews it at times, but is unable to swallow it, except in small quantities and with the continuous assistance of some beverage. Finally, the patient fails to ingest food at all, drinks copiously of fluids, and induces a dilatation of the stomach. Not a few consumptives with appendiceal disorder fall into this category.

8. *Pseudodyspepsia in Aerophagic Patients.*—Nearly all the above enumerated errors in food ingestion may be and usually are factors in the causation of aerophagia, and in many instances the attending physician has to treat a complex rather than a simple condition. Yet there are

many cases, too, in which the aerophagia is the main difficulty, and indeed, aerophagia is the most frequent cause of pseudodyspepsia among the tuberculous. The variety found in these cases is usually the minor type of aerophagia, and reference hereinafter will be made exclusively to this type of the disturbance.

There are two main causes of minor aerophagia, *viz.*, alimentation and cough. There may also be a prolonged catarrh of the nose and pharynx, or of the larynx and pharynx, which, with its associated excessive secretion of saliva and mucus, becomes associated in many nervous subjects with sialophagia and aerophagia.

Due attention should be paid to the hindrance sometimes offered to respiration in the nasal cavities, as well as to the bad habit of breathing with the mouth open in subjects previously operated upon for adenoid growths or enlarged tonsils. Some of these subjects, as soon as they exert themselves in walking up an incline, are seized with spasm of the respiratory passages and swallow considerable amounts of air through their open mouths.

Among other cases of this type, I recently saw a young woman who had formerly suffered from mediastinal pleuritis and had narrowed nasal passages, and was seized each afternoon with highly distressing gastric disturbances. She had been treating herself for months for flatulent dyspepsia. As a matter of fact what she did was to go out for a walk in hilly country after each meal, exert herself to a great extent, and then return home with her stomach distended with gas, in great discomfort, and remain quiet and in pain for hours, until the gas had passed from the stomach into the bowel. This patient was urged to walk over flat country only, learned how to induce an eructation whenever, in spite of this precaution, she felt somewhat puffed

up, and was permanently cured in ten or twelve days' time.

Aerophagia at times simulates a dyspeptic disturbance all the more readily in that during the post-prandial period of discomfort, pain, or even pronounced distress, acid eructations and bilious regurgitations are rather frequently associated with it. Where such a condition has been present for a long time, both the patient and physician finally come to the conclusion that there is some obstruction at the pylorus. Naturally, any drugs used are not likely to improve the situation.

Needless to state, in a tuberculous patient with extensive mediastinal pleuritis, especially if situated on the left side, aerophagia may be accompanied by actual angor, fainting spells, or anginose pain over the heart. These manifestations are quite characteristic when they appear shortly after the beginning of a meal and compel the patient to stop eating at the time. In other instances the warning symptom is ocular vertigo coming on at the table or shortly after conclusion of the meal.

It cannot be pointed out too often that the most deceptive and misleading aerophagic complications frequently occur in definite attacks of variable duration—from a few days to a few weeks—in many nervous consumptives, and that they often appear suddenly following emotional stress, psychic impressions, domestic trouble, etc. When once induced these attacks are persistent, and generally cease only when the diagnosis has been made and the patient carefully enlightened and convinced as to the harmless nature of the manifestations present. Indeed, it is an urgent necessity in these cases to detect the existing aerophagia, for if a mistaken diagnosis be made there is no reason why the attack should not be almost indefinitely prolonged.

When once the diagnosis of aerophagia has been made —and this is, as a rule, rather easy provided the possible occurrence of this condition is constantly borne in mind— the therapeutic indications are plain. The tuberculous subject should first be taught not to swallow air, or at least, to swallow as little of it as possible. He should then be taught to expel ingested air by eructation, instead of waiting until the pylorus is finally ready to let it pass into the intestine.

The manifestations dependent upon aerophagia may, in some particularly nervous subjects, persist for years and by their odd nature mislead the physician into all sorts of diagnoses. Mention may be made in particular of a patient with chronic fibroid tuberculosis, with long-standing cough and expectoration unattended with fever, who for about ten years had been consulting innumerable physicians and could have made a good-sized book out of all the diagnoses, prescriptions, and recommendations he had received for conditions ranging from simple nervousness to cancer of the pylorus and esophagus, and who was merely an exemplification of a somewhat unusual form of aerophagia. It took a long time, however, to make him accept so simple an explanation, which upset all his cherished notions as to the nature of the disturbance.

In brief, the practitioner should always be on the lookout for aerophagia and its more or less confusing manifestations when called upon to treat dyspeptic disturbances in tuberculous patients.

9. *Pseudodyspepsia Due to Excessive Ingestion of Fluid With the Meals.*—While excessive ingestion of fluids with the meals by consumptives usually results in a more or less pronounced softening of the stools—a point to be referred to again later on—this indiscretion in hygiene is likewise frequently a cause of dyspeptic disorder.

There occur the usual gastric symptoms appearing soon after meals, *viz.,* a feeling of weight in the stomach, somnolence, ocular vertigo, or else, in other patients, the more tardy symptoms, such as acid eructations and more or less continuous gurgling in the stomach, generally ascribed to dilatation of this organ. Some patients finally get accustomed to these discomforts, but fail to secure proper nourishment from the food ingested and become subject to attacks of congestion of the liver.

Others, indeed, gradually lose the ability to eat any of the ordinary foods or even any exceptional and specially prepared dishes, and fall back exclusively on a liquid or semiliquid diet. This may continue for months, and meanwhile, in spite of all antidyspeptic remedies employed, the patients are continually drinking large amounts of fluid. Not long ago I had occasion to see a young tuberculous woman, free of fever but thin, anemic, and feeble, who had been treated for a prolonged period for inveterate dyspepsia. The underlying trouble was simply that she drank copiously of fluids during her meals. Reduction of the fluids to one-half a glassful with each meal corrected the condition absolutely. Within a few days her appetite and digestive functions were restored, and her health improved very rapidly.

In a less pronounced form, this is the pet indiscretion of at least a third of all consumptives. In the treatment the main object is to convince the patient of the true nature of the gastric disturbances from which he is suffering.

10. *Pseudodyspepsia Due to Disease of the Appendix.* —The so-called gastric disturbances manifested in pain and disordered digestion, with or without nausea or vomiting, are frequent in tuberculous patients with chronic appendicitis or appendicitis occurring in subacute attacks. It is

not uncommon to see patients who have undergone prolonged treatment for dyspeptic disturbances and in whom the source of the trouble resides wholly in appendicitis. Such disturbances may, indeed, compromise the chances of recovery by preventing proper nutrition, and consequently also, a cure of the pulmonary foci of disease. Correct diagnosis of the cause points directly to the form of treatment required in these cases.

**B. Pseudoenteritis.**—In recognized, established cases of tuberculosis the attention of the patient, family, and attending physician should always be directed toward the condition of the abdomen, in view of the well founded apprehension which everyone has or may have of extension of the disease to the bowel. Yet how many patients, whether children, adolescents, or adults, in the absence of any suspicion of intestinal tuberculosis, exhibit for months and years disorders to which the term bowel inflammation or enteritis is conveniently applied! One patient has a constipating enteritis, another a diarrheic enteritis, while in a third diarrhea and constipation alternate. In some cases the disturbance is almost or quite continuous; in others it occurs in definite attacks, separated by intervals of satisfactory intestinal functioning. Very frequently the patients refer to prolonged attacks of bowel trouble they had in childhood; in other instances, the disorder set in more recently, with or without an apparent cause, *e.g.*, overfeeding to which they had been subjected for a time.

It is not always an easy matter to ascertain the true nature of these former or recent bowel disturbances.

Obviously the consumptive is not immune to the diarrheal disorders of variable causation, including parasitic or toxic diarrhea, to which any healthy person is liable, and when a tuberculous subject suffers from obstinate enteritis

in the absence of any other definite symptoms of intestinal tuberculosis, it is always well to investigate the question of a possible parasitic infestation of the feces.

It can be stated without hesitation, however, that, apart from frank tuberculosis of the digestive tract, these nameless forms of enteritis are generally instances of false or pseudoenteritis.

The varieties of pseudoenteritis most often encountered clinically in lung tuberculosis are the following:

1. *Pseudoenteritis Due to Poisoning by Drugs.*—The drug intoxications previously mentioned involve the intestines much less frequently than they do the stomach. Nevertheless their effects may be manifested in the production of serous exudation and diarrhea, and more often, of obstinate constipation associated with attacks of mucomembranous enteritis. The possibility of this condition should always be remembered in consumptives who have been receiving drugs in excess.

2. *Pseudoenteritis of Alimentary Origin.*—This form is rather common.

In some instances the trouble results from excessive food ingestion of any sort, the food being taken in numerous meals in the course of the day, which, either with or without marked and simultaneous gastric symptoms, maintain the diarrhea as long as the faulty diet is continued. Sometimes the disturbance is due merely to the taking of an excess of food by a patient who would be able to digest well a normal amount of food; in other instances, it results from reduced digestive capacity in a patient who could digest a smaller amount of food, but whose alimentary tract fails if a considerable amount is taken. This form of enteritis is common in the rather slender and feeble type of consumptives, ordinarily light eaters who, whether with

or without appendiceal trouble, try to do too much and strive earnestly to ingest a large amount of food at their meals.

In certain other cases, again, improper choice of foods is at the bottom of the condition. Some patients, from personal fancy or in order to stimulate their appetites, insist upon taking indigestible articles of food almost exclusively; others overfeed themselves with raw meats which later pass out undigested, or with raw or but slightly cooked eggs which poison them. Others still use an excess of milk with their meals as a table beverage, causing a persistent diarrhea. Some few, indeed, do not tolerate milk well with their smaller meals, and their stools clear up as soon as the milk is stopped. It may be put down as a general rule that but few patients who are eating well are able to take milk *ad libitum* with their heavier meals. As tuberculous patients do not always ask permission to take this special article of food and are not likely to think of mentioning it at all, its possible effects should always be borne in mind where there is continuous diarrhea.

3. *Pseudoenteritis in Patients with Inadequate Teeth.*—This is a very common form, as is also the corresponding form of pseudodyspepsia, already mentioned.

4. *Pseudoenteritis in Rapid Eaters.*—This is likewise very common, and is not always readily overcome.

5. *Pseudoenteritis Due to Excessive Ingestion of Fluid With the Meals.*—This generally occurs in association with pseudodyspepsia similarly caused. In the majority of instances it does not induce abdominal pain, but diarrhea, or at least an abnormal state of the stools, is a customary result. The treatment is simple in subjects who are willing to co-operate with the physician. It consists in almost complete suppression of fluids at meal

replaced by the taking of a glassful of fluid one hour before the larger meals.

6. *Pseudoenteritis Associated with Unduly Frequent Defecation.*—Too frequent defecation (pollakicopria) is sometimes practically physiological in the sense that not a few well persons make it a practice to empty their bowels two or three times a day—some because they are heavy eaters, and others from a species of habit or mania, which leads them to continue the practice for fear that if they do not, their health will suffer. When these persons, however, develop tuberculosis, their pollakicopria nearly always assumes a pathological form; from various causes, their stools are then not only too frequent but also abnormal in character. Such patients always refer to their bowel trouble or enteritis, which they describe as having been present already for a more or less prolonged period. I have even met with some who considered it quite natural to go to stool five or six times a day.

The most usual causes of this transformation of a "physiological" pollakicopria into an abnormal one consist of the above mentioned deviations from a proper diet. Having become tuberculous, these individuals in some way or other consume food inappropriate for them, and their digestive functions are consequently overburdened and fail.

The aerophagia from which so many consumptives suffer is to be particularly borne in mind as one of these causes, and the pollakicopria is then closely allied with the intestinal phase of the aerophagia. Indeed, it is in this way that many tuberculous subjects, previously not pollakicopric, are forced into the habit of unduly frequent defecation when their pulmonary disease has become established.

Many aerophagic subjects, unconscious and uninformed of their condition, retain in their stomachs the air they have

swallowed, and after having suffered from acute distention and pain in the stomach as manifestations of flatulent dyspepsia, are seized with abdominal distress when the air has passed through the pylorus. Borborygmi, constrictive sensations, colic, and spasm, not only of the bowel but also of the muscles of the abdominal wall, are experienced, and persist until the accumulated gas has been eliminated through the lower intestine—a process which occurs, as a rule, only after a considerable interval. Some patients are in discomfort from this cause throughout the twenty-four hours, except for short periods of sleep, from which they wake up in marked distress. The associated painful spasms of the intestine often assume the nature of a continuous peristalsis extending down to the rectum and giving rise to an actual desire for defecation. Generally only gas is expelled, but as the patient experiences much relief from such expulsion, he makes no effort to prevent the issue of fecal matter; in fact, he instinctively favors the defecation because it gives him temporary relief, and naturally feces improperly dealt with in the intestine are of a more or less diarrheic consistency when passed. As he knows nothing about the true cause of the disturbance, he calls it simply a bowel inflammation or enteritis.

This sequence of events occurs as often, according to my observations, in men as in women; yet it seems in some degree related to a neurotic tendency. In contrast with many aerophagic manifestations which recur frequently in attacks lasting a week or two and disappearing spontaneously or through education and strengthening of the will power, pollakicopria among the tuberculous appears to be a long standing condition, running a slow course and at times assuming the form of an inveterate mania or habit.

Needless to state, the initial measure in the treatment of these cases is antiaerophagic education and recuperation of the power to eructate voluntarily. There are some tuberculous subjects, however, who respond very poorly to reeducation, and remain very miserable on account of their aerophagic pollakicopria. At times, indeed, conditions are such as to seriously compromise the success of the dietetic cure and hence also, in the long run, of the patient's recovery from tuberculosis. The object then to be sought is to restore intestinal quiet by means of opiates, such as paregoric, or by the use of soothing and antispasmodic suppositories.

In the more usual, less inveterate cases, on the other hand, even in subjects who defecate four times a day, it is easy by education of the will-power to reduce within a week the number of defecations to a single one in the twenty-four hours.

7. *Pseudoenteritis in the Form of Menstrual Diarrhea.* —Tuberculous or non-tuberculous women who, though enjoying a normal menstrual function, develop an attack of diarrhea lasting a few days in every month, do not speak of this disturbance as their bowel inflammation or enteritis. The opposite tendency obtains, however, among the numerous women suffering from lung disease whose menstrual function is about to cease or who are in process of recovering it.

Where, in view of the fact that the menstrual flow is being reduced at each successive period, vicarious diarrhea assumes a preponderant rôle in the process; and especially where, the flow having entirely ceased, the menstrual period is often marked merely by an abnormal rise of temperature, manifestations of lung congestion, an occasional epistaxis, and a number of fluid or serous stools every day for a few

successive days, then the patients show no hesitation in stating that for some months they have been suffering from attacks of enteritis.

As a rule, it is easy to recognize the nature of these attacks. But there are others, too, in which the diagnosis is rather a difficult matter. Some young girls and young women, by virtue of an improvement in their general condition, are manifestly about to regain their menstrual function, previously lost for a varying number of months, and at the time of the expected period show an atypical menstrual process unattended with bloody discharge but with a frequent serous diarrhea. Even in such instances the diagnosis is relatively easy. But there are other patients in whom, in the absence of any other symptoms, this serous diarrhea sets in and persists a week or two, almost or quite uninfluenced by any therapeutic procedure and without constituting much of a drain on the patient, who may even gain in weight during the process instead of losing. These peculiar features are certainly the main indications that will place the physician on the right path in diagnosing such forms of pseudoenteritis.

The diagnosis of menstrual diarrhea is confirmed when a patient of this type, after having more or less periodical attacks of bowel trouble for several months, finally finds her periods returning while the attacks of serous diarrhea consentaneously disappear.

Therapeutic measures have, as a rule, little influence on this variety of pseudoenteritis. The rational procedure would be to re-establish the menstrual flow, a result which, with the means at present available, can be obtained only through improvement of the general health. Yet at times opium in the form of paregoric will assist in reducing the number of serous stools, and the patients are naturally

pleased at any improvement in this direction. Needless to state, in many cases the preparations of iron are strongly indicated, and prolonged experience has led me to conclude that they may be prescribed without any prejudicial effect, and, indeed, with marked benefit.

8. *Pseudoenteritis Due to Constipation.*—Nothing is more thoroughly recognized by physicians than that constipation is a locally acting factor of the first importance in mucomembranous enteritis or enterocolitis. This applies likewise among tuberculous subjects, in women especially. Not a few of these patients, chronically constipated, have been suffering for months or years from a bowel disturbance characterized either by the mere passage of mucus-laden stools, or by irregularly recurring attacks of diarrhea, occasionally interspersed, in a few instances, with painful and subfebrile attacks of sigmoiditis. Generally these are cases of ordinary fecal retention, as may readily be ascertained and demonstrated to the patients by careful inquiry into their habits as regards defecation. The more difficult task is, perhaps, that of convincing them that the enteritis, from which they have ostensibly been suffering for ten or twenty years, is really secondary to the constipation.

Previously they had been able to withstand the effects of the constipation fairly well, but when they developed active tuberculosis, this was no longer the case. They must be given appropriate re-educational advice, in order that they may be induced to evacuate their bowels every day without using drugs. Their existing tuberculous condition demands that this object should be attained, and when once it is attained, the enteritis is cured.

Many times have I emphasized the importance of this process of "deconstipation" in consumptives, and shown that some patients begin to improve and master their pul-

monary lesions only from the day when their bowel functions have been restored to normal regularity.

9. *Pseudoenteritis of Appendiceal Origin.*—In tuberculous subjects the appendix may at any period of life, though more especially from later childhood on, be responsible for a considerable proportion of the manifestations of so-called enteritis from which these patients suffer—apart, of course, from the instances of frank tuberculous involvement of the appendix, cecum, and neighboring portions of the colon.

Beginning with later childhood, disease of the appendix finds its expression in various forms of intestinal disorder.

In some cases the condition is simply a constipating enteritis. These patients—in France—are, as a rule, sent to Châtelguyon. This is the most amenable type of disturbance, for generally, after some years, the whole process quiets down and the child remains thereafter a latent appendix case or one with attacks occurring at long intervals and not always requiring surgical intervention.

In other instances there is present an enteritis combined with alternating constipation and attacks of diarrhea. This form is a more serious condition than the other, as it points to an intestinal intolerance or impaired digestive capacity as regards a host of articles of diet generally well borne by children of the same age.

Again, there may be present a semi-diarrheic enteritis. The children are not troubled with an actual diarrhea, nor with numerous bowel movements, each day; they generally go to stool but once a day; but there are never any formed stools. This condition persists for months and years; a child thus afflicted remains sickly and delicate, has no appetite, and becomes nauseated on slight provocation.

In each of the above varieties, pain may be quite or almost wanting. If pain does occur, it may assume one of various types. In one patient it may be experienced in the epigastrium; in another, across the abdomen; in many, it is most marked over the descending colon—a deceptive feature which promotes diagnostic confusion, pointing toward colitis rather than appendicitis. It should always be considered a probability that a child who has no appetite, dislikes nearly all kinds of food, does not care for "goodies," fails to gain weight, and continues sickly, is suffering from disease of the appendix; in but a few instances will this presumption prove to be wrong and a search for some other cause become necessary.

The same clinical conditions occur likewise in adolescent and adult tuberculous subjects, and three features should be considered particularly significant in these cases, *viz.*, ill-formed stools once a day, recurrent or constant nausea, and discomfort as much over the sigmoid as on the side of the appendix. Upon trying to elicit tenderness on the right side in such a case, some tenderness will generally be found present.

The treatment of these appendiceal forms of pseudo-enteritis is sufficiently indicated by the clinical features witnessed. For so long a time as the appendix continues tolerant of a prescribed and selected diet, as the patient remains in a good general condition and the pulmonary disease shows no tendency toward rapid progression, the physician may continue expectant treatment, keeping constant watch over the condition of the stools and applying all serviceable medical measures. As soon, however, as the patient seems, in spite of all care, to be losing ground, operative treatment should be resorted to without delay—unless a course of

local heliotherapy should prove successful in checking dangerous activity of the appendicitis.

From all the observations above presented, the reader will have come to realize how many and varied are the manifestations of pseudodyspepsia and pseudoenteritis among tuberculous patients, and how necessary it is to ascertain the cause of the trouble and remove it—an object which is in most cases possible of attainment. By keeping in mind these clinical and therapeutic data the physician, while fondly awaiting the production of a vaccine or serum against tuberculosis, may forthwith assist in the recovery of a considerable number of consumptives whose condition would otherwise certainly go from bad to worse.

### III. Hygiene of the Upper Respiratory Passages.

One observes very frequently among tuberculous patients abnormal conditions of the nasal cavities—either distortion or deviation of the septum or turbinates, or chronic inflammation of the mucous membrane. The majority of them have rhinitis sicca and use their handkerchief but little. Frequently, upon awaking in the morning, however, hawking occurs and one or more masses of mucus, which had accumulated overnight on the posterior wall of the nasopharynx, are expelled.

In some patients the nasal passages are almost constantly obstructed; they sleep with their mouth open, which keeps up the inflammation in the throat. It is a fact that the drawbacks inherent in this rhinitis are greatly reduced by the habit of sleeping with the windows open, but this is not, as a rule, a sufficient remedy. Many of these nocturnal mouth breathers are former adenoid subjects who have, indeed, had their adenoids removed, but in spite of it have maintained for years the habit of sleeping in this fashion;

their faulty habit has proven a difficult thing to overcome. The best thing to be done is to re-educate them in this respect, provided proper co-operation on their part can be obtained. The procedure should be begun in the daytime, orders being given to persons in their vicinity to warn them repeatedly that their mouth is open.

Rather frequently, upon awaking, blood-stained mucus is expelled, while at the same time there may occur actual epistaxis or blood appear upon the handkerchief. This constitutes a form of pseudohemoptysis which is more or less alarming to the patients.

In some instances, indeed, differentiation of these blood-stained expectorations from those issuing from the lung is by no means easy. With a little observation, however, the blood streaks in pharyngeal mucus—the blood partially covering pulmonary sputum on its way through the pharynx—can usually be fairly well recognized.

Needless to state, the specialist should be sought for operation in cases presenting adenoids or obstructing deformities in the nasal cavities. In most instances, the rôle of the physician is limited to reducing as much as possible the discomforts of chronic rhinitis through local hygienic treatment. Heavy smokers must be forbidden tobacco.

Snuff powders may be prescribed which, like finely powdered boric acid mixed with menthol, camphor, etc., soon induce moistening of the nasal mucosa and cause the patient to blow his nose. At night, on retiring, a few drops of an oily solution of gomenol should be introduced into each nostril, or the patient may anoint the parts by means of his little finger with a small quantity of vaseline containing menthol or sulphur. During the night, these fatty substances melt down in the nasal cavities, keep the membrane unctuous, and prevent the formation of crusts.

Finally, in certain cases recourse will be had to nasal irrigations with Weber's siphon or other similar apparatus. Boiled water with salt, 5 or 6 grams to the liter, which is harmless and answers most of the indications, should alone be used for this purpose.

With the aid of these very simple measures, the patients are to keep their nasal passages as freely open as possible.

For the same purpose, and also to maintain some degree of moisture in the nasal cavities, pharynx, and larynx, not to mention the trachea and bronchi which also derive some benefit, spraying of the nose, mouth, and pharynx, with complete respiration of a jet of water vapor, is recommended.

Excellent spray apparatus is now available at slight expense, and no patient should deprive himself of this highly advantageous measure.

The spray acts, in my estimation, chiefly through the water in a state of fine subdivision which is inhaled, its effect being comparable with that of emollients applied over an inflamed or painful area.

It is the general custom, however, to introduce with the water vapor from the spray various medicinal fluids. If these are used, they should at least be as bland as possible.

Spraying of irritant and caustic fluids is wholly inadvisable; creosote in large amounts should, in particular, never be used.

Some years ago the procedure was in vogue of having consumptives inhale at intervals air previously passed through creosote solution. I have many times observed the appearance of streaks of blood in the sputum after a few very brief inhalation treatments of this sort. I became entirely convinced of the direct relationship of cause to effect in this connection.

I much prefer to introduce in the apparatus as medicinal agents the balsamic substances, eucalyptus, and benzoin.

Formerly a little device known as the nasal inhaler was widely used. It consists of two short aluminum tubes to be inserted in the nostrils. Various volatile fluids were introduced in the lumen of the tubes.

Many people believed that by inhaling through this apparatus, charged with antiseptic fluids, they were protecting themselves from various infectious agencies. In this they grossly overestimated the value of the nasal inhaler and in a sense lowered it to the level of the old-time camphor cigarette, which was supposed to afford protection from all diseases. Nevertheless the patients should perhaps be allowed to retain their pleasant delusion in this respect, as the inhalation of various perfumes through these little inhalers cannot prove harmful.

In any event, I believe the inhaler, charged with menthol, to be of signal service, not in chronic rhinitis, but in acute or subacute coryza. Its use is also indicated where irritation in the pharynx and larynx is accompanied by spasmodic cough and seizures allied to those of asthma.

Thus, hygienic care of the upper respiratory passages is of great importance, not only because, as was pointed out in a preceding chapter, children with defects in their nasal cavities, such as adenoids or stenoses of any type, show imperfect chest development and become more or less predisposed to tuberculosis; not only because a number of instances of adenoid vegetations and chronic tonsillitis are already wholly or partly of tuberculous nature and constitute permanent foci for tubercle bacillus infection of the lymphatic glands of the neck and even directly of the bronchi; not only by reason of the numerous minor discomforts to which, as was just mentioned, the patients on

general hygienic treatment are subject, but also because individuals with chronic nasal or pharyngeal affections are at all times exposed to inflammatory exacerbations in these structures and because the resulting acute, febrile disturbances may react unfavorably on the tuberculous lesions already present in their lungs.

In everyday life, it is often remarked with good reason that a cold in the head tends to travel down to the chest; it is stated that trouble in the nasal cavities brings on asthmatic attacks. In tuberculous patients, however, the results are more serious. Many times one sees a pulmonary lesion directly on the road to recovery, or even already "dried up," suddenly take on new activity when the subject has had an exacerbation of rhinitis or pharyngitis. One sees patients with very slight lesions in the lungs for a number of months thought to have entirely recovered, whose apexes become moist and secrete every time an acute disturbance occurs in the nose or throat. All this takes place without bronchitis and without any widespread congestion of the bronchial tubes. The pre-existing tuberculous lesion, drawing down upon itself the infectious agent, alone becomes involved.

Hence the absolute necessity of carrying out energetic and continuous treatment, if possible curative, or at least palliative if nothing better can be done, of the upper respiratory passages in all tuberculous patients suffering from disorders in this vicinity. And such patients are legion.

Breathing exercises come within the field of hygiene of the respiratory passages.

It may be put down as a definite rule that one-half of all consumptives do not know how to breathe properly; and this fact must certainly have exerted some influence in the pathogenesis of the disease. The apexes of their lungs have

never expanded, and have remained almost in a state of atelectasis. They thus constituted a species of lost territory on the confines of the respiratory field, never fully swept into by the air, and in which the tubercle bacilli, like weeds, found a favorable growth medium.

Patients must be shown how to get the air to enter and circulate in these portions of the lungs; they should be taught to make use of the apical lung tissue, the utility or even the existence of which they have never even suspected.

The various exercises used with this end in view need not here be described at length, but I shall recommend one very simple type of exercise which often proves sufficient to enhance general lung expansion and, in particular, to increase the permeability of the apexes.

Twice a day, morning and evening, the patient, preferably in the sitting posture, but without his back being supported, the hands resting loosely on the knees and the body relaxed, begins the exercise by lowering his diaphragm, as shown by slight enlargement of the abdomen, and under these conditions begins to draw in air very slowly, without exertion, until he feels that he can proceed no further without difficulty and without bringing on cough; the chest expands and correspondingly straightens up. He remains in this position for about a second, and begins expiration, just as slowly as the air was drawn in, and when the lungs have been emptied as completely as possible, he pauses for a second, and then repeats the procedure.

In this exercise, the patient should feel that he is not making any effort, but that his chest is expanding because the air is entering it as though it were being blown in from the outside. The patient gradually gets accustomed to carrying out inspiration and expiration very slowly, thus keeping the chest muscles in a constant state of contraction.

When these exercises are performed properly, ten to twelve respirations morning and evening are enough; a larger number would readily induce quite useless fatigue.

If the nasal passages are at all open, the breathing should preferably be done through the nose; but if necessary, it may be carried on through the mouth.

This is a simple procedure which is readily learned in two or three lessons.

There is no question but that many patients with narrow and more or less flat chests rapidly gain in lung expansion upon carrying out regularly these simple breathing exercises. The procedure likewise has the effect of forcing air to circulate through the congested portion of the lungs.

One should not conceive the idea that these exercises are applicable and beneficial only in adolescents. Adults naturally cannot gain as much in chest expansion; yet by virtue of the slowness of the inspiratory and expiratory movements they are enabled to keep the ribs elevated longer and more and more easily, and this gets them accustomed to expanding their lungs to the greatest practicable extent. Indeed, they themselves promptly recognize the favorable effects of the exercises.

I must confess that I do not particularly approve of lung exercises combined with rhythmic movements of the arms, such as are practised in the gymnasium and occasionally recommended for tuberculous patients. The relations between the apical pleura and the root of the upper extremity are too close. This class of exercises belongs to the group of arm exercises which I forbid to patients with either active or recently healed tuberculous lesions.

### IV. Hygiene of the Act of Coughing.

All consumptives cough in some degree. But there are two varieties of cough in these patients, the useful and the useless.

Useful cough is that which results in expulsion to the exterior of sputum gathered into a single mass and cast out owing to the irritability of the bronchi. It is more or less distressing and paroxysmal, according to the case, and there are some who practically do not cough at all to bring up sputum. They simply carry out a single spasmodic movement of the bronchi, trachea, and pharynx, and that is all.

Useless cough is that which does not result in the expulsion of sputum. Most patients, left to their own devices, form the unconscious habit of coughing in paroxysmal fashion as soon as they feel the least tickling sensation about the larynx or trachea, or in the chest. Sometimes, expectoration follows, but often it does not, and the only result is marked fatigue, congestion of the head, and even vomiting. In fact, this cough, supposedly intended to relieve the original tickling sensation, has served only to irritate and induce congestion of the upper respiratory passages, and keep up the paroxysm. There is no obvious reason why such cough should not continue indefinitely.

Some unfortunate consumptives spend a considerable part of the day and night in this manner, unable to lie down, constantly suffering from frightful paroxysms of cough. The first thing they say to the physician is that this obstinate cough is keeping them from eating and making them vomit what little food they actually get down.

Let the reader compare with this distressing condition of many patients that prevailing in sanatoriums. Let him sit down to a table d'hôte meal with thirty to fifty con-

sumptives. Through the entire hour spent at the table he will hear but one or two paroxysms of cough, or sometimes none at all. Let him walk up and down on the veranda where the patients are under treatment; he will hear very few distressing paroxysms of cough, but rather, brief acts of coughing just sufficient to bring up the sputum. The major paroxysms occur among these patients mainly when they swallow food the wrong way or laugh somewhat too heartily.

How is this striking result obtained? Simply through the cough discipline which patients in sanatoriums are required to follow. In a few days they are taught to suppress useless cough.

To do so, it is only necessary to resist the desire to cough. The patient trains himself, in the first place, to disregard the disturbing tickling sensation already referred to, and in the second place, to restrain himself from coughing when he feels that expectoration is about to occur. He waits until the mass of sputum has become detached of its own accord and requires only one or two slight hacks to be expelled.

All this works out just as simply in practice as in theory. For the first few days the patient is compelled to be constantly on his guard in carrying out the procedure, but soon it is all done instinctively and unconsciously.

This cough discipline is naturally acquired more rapidly in a sanatorium than if the patient is being taken care of alone, for the example set by his fellow-patients acts by suggestion in establishing this kind of a habit. Yet any tuberculous patient can soon acquire the habit if he willingly puts his mind on it.

There is one variety of cough, however, which may form an exception to this rule, *viz.*, spasmodic laryngeal

cough. This variety is much more rebellious, not only to cough discipline but even to sedative drugs.

Since the nervous element is often an important factor in its production, it is well always to inform the patient carefully that this special form of cough will disappear when the general health has improved, such improvement resulting secondarily in reduced congestion in the larynx.

As an adjuvant measure, for the first few days, the physician may prescribe, to be given at regular intervals through the twenty-four hours, a few very small doses of opium, which is always the drug *par excellence* for cough. Opium, indeed, removes the desire to cough. After a short time the drug becomes unnecessary and is then reserved for the night, in patients whose copious expectoration even then too often wakes them up.

It is our practice to use extract of opium in pills of 0.01 gram ($^1/_6$ grain) each. Our consumptives often carry a box of these with them. This is a useful precaution not only for patients who are compelled to do something to reduce the frequency of coughing, but also for casual use by those who at some particular time find a little blood appearing in their sputum. In the latter event, in the interval before other measures can be applied, they know they are to take at once two or three of these pills and place themselves completely at rest.

Some patients experience marked difficulty in swallowing even the smallest pills. To these we give a solution containing 0.01 gram of extract of opium to the teaspoonful of cherry-laurel water.

Opium is not only the sovereign remedy for cough in tuberculosis, but also exerts a manifest effect in reducing the amount of expectoration, besides lessening the *frequency* of expectoration by suppressing the desire to cough.

Much good is said of this drug in tuberculosis, and also much that is bad. Too little good, in my estimation, and far too much bad.

Opium is accused of taking away the patient's appetite, of inducing constipation, and of causing gastric pain. Anything can happen, to be sure, and some consumptives are inconvenienced in some way or another even by small amounts of the drug. But one should bear in mind that this is the case with all drugs, and that if the benefit from them had to be given up because certain patients failed to tolerate them well, it would be hard to see what remedy could be employed at all.

The facts are that opium increases the amount of food taken in many patients because it eliminates cough before and after meals; that gastric pain only exceedingly rarely follows its use in small, repeated doses; that I have rarely seen it interfere with digestion, and that among ambulant tuberculous cases it very seldom brings on constipation that one need pay any attention to.

As already remarked, anything can happen. One should expect to meet once or twice a year with a patient who, after experiencing subjective benefit from opium for a few days, suddenly finds himself quite unable to take food. But the remedy for this exceptional occurrence is immediately at hand.

Again, opium is claimed to bring on trouble by reducing and even checking expectoration.

In this connection, due distinctions must be made. If during an attack of acute bronchitis, in a febrile subject, opium is given in large amount at a time when the cold is maturing, or if in a patient with chronic bronchitis with free expectoration, or in an obese asthmatic during a paroxysm, the drug is administered freely, there is a likeli-

hood of its favoring suppurative involvement of the lung and causing trouble.

Or, if in a case of tuberculosis still subjected to strain from all directions and with the chest burdened with moist râles, much opium is given to relieve cough, there will be a still greater likelihood of its doing harm. As already mentioned in an earlier chapter, consumptives who are being subjected to overstrain do not bear any drug well and the only remedy suitable, necessary, and sufficient for them is rest and a liquid diet.

Under the usual conditions in which a tuberculous patient is undergoing treatment, however, nothing of this kind is to be feared, for the excretory functions as a whole are kept in the best possible condition. Nevertheless, any form of medication must be administered in a cautious manner.

Opium is one of our reliable drugs—a rare sort, indeed. But it must be given in sufficient dosage to overcome the cough.

Many patients educated, like most every one, to be in abject terror of opium, are at first rather disinclined to take it. The comfort they promptly derive from it, however, soon relieves them of this prejudice. To opium many patients owe their ability to spend fairly comfortable nights, at least at the beginning of their treatment, not so much because the drug acts as a soporific, according to the usual conception of its physiological effects, but because it checks or reduces the cough and expectoration that have been keeping them from sleeping.

Along with opium may be considered its derivatives, codeine, morphine, diacetyl-morphine and others in various forms and likewise other agents not derived from opium, the number of which has been increasing daily.

Obviously, to master certain forms of cough, it is highly useful to have at hand several drugs that may be given in alternation, the beneficial action of each soon wearing out, as a rule. It is always better to change the drug often than to increase indefinitely the dose of any single drug.

### V. Hygiene of Expectoration.

This subject requires consideration, first, in relation to the patient himself, and secondly in relation to others.

In the first place consumptives should always eliminate their sputum to the exterior. Usually it is not necessary to urge them to do this, for both by instinct and on account of the unpleasant nature of the secretions they know that it is more cleanly to expectorate than to swallow the more or less purulent material discharged from their lungs.

Among the patients who expectorate to the exterior when alone, however, there are some who, through mistaken pride, dispense with the act of expectoration when in company with other people. The procedure they follow under these circumstances is, indeed, quite simple. As soon as the sputum has been brought up to the laryngeal inlet, an imperceptible swallowing movement causes it to pass into the esophagus. It is uncleanly and has a bad taste, but, at least, no other person is aware that anything has occurred.

Furthermore, there are some patients who never expectorate. These are, as a rule, confined to the female sex. At the outset of the disease, when the sputum is in very small amount, the habit of swallowing it is formed, the idea being that to spit is uncleanly and impolite. Later this habit is kept up, almost unconsciously, no matter how large the amount of pus discharged from the lung gets to be. Thus, many young girls, young women, and even young

men, go along until they are seriously ill with tuberculosis without anyone about them being aware of it. They never expectorate!

Not a few of these young patients keep up this species of delusion from motives of false pride, although knowing full well that they are suffering from lung trouble.

This leads us naturally to the question of *closed* and *open* tuberculosis.

On the day when this question was first broached, the door was opened, in my estimation, to discussions far more prejudicial than useful. This question, indeed, thereupon passed at once from the exclusive field of medical practice to the domain of social life and even of the law.

When the assertion is made that the infection in such and such a tuberculous person is closed, the conclusion which naturally follows is that the patient is not a source of infection to others. Closed tuberculosis manifestly does occur. In the first instance, certain primary apical lesions, still in their incipiency, are closed for the good reason that they are not as yet sufficiently advanced to have become moist. But they may become moist in twenty-four hours, or in a few days, either through congestion from overstrain or in the natural course of events. Who among us would be willing to certify that such and such a tuberculous subject who is not yet expectorating is not going to be expectorating within a week's time?

Again, there are certain forms of tuberculous infiltration, usually secondary pleuro-pneumonias, which are completely closed from their very nature. From the very fact that they are secondary, however, it is more than probable that the subject has already been harboring open lesions at the apexes for a varying period of time, whether he is expectorating little or much or is commonly considered not

to be expectorating at all. Reference will presently be made again to this last feature.

Now, among these tuberculous infiltrations, or pleuropneumonias, there are certainly a few that remain dry and closed because they run an abortive course. The greater number, however, are destined to undergo central necrosis and begin to suppurate within two or three weeks and sometimes even sooner, though sometimes later. Such a condition is, therefore, only provisionally a closed tuberculosis. Even granting that the patient is no longer eliminating his apical lesion by expectoration, it is therefore to be surmised that he will be seen expectorating within two or three weeks. Can the stability of such a precarious situation be at all reasonably depended upon?

There are also, of course, the old, thoroughly healed lesions that are closed, but in this event the patients are no longer cases of tuberculosis; they are merely partial pulmonary invalids.

There are also old, dry pleurisies. But too often these are actually moist beneath the surface, and at any moment the underlying lung tissue may become hyperemic from overstrain and begin to eliminate bacillus-laden mucous discharges.

Finally, there are the tuberculous subjects who do more or less expectorating, with various kinds of lesions, generally some long-standing focus of softening, and in whose sputum tubercle bacilli are not detected in the course of one or even two examinations. In these the tuberculous process is certainly open, but it is described as being closed as regards the tubercle bacilli. Now, it must be thoroughly borne in mind that sometimes the bacilli are found only at the eighth or tenth successive examination of the sputum.

Thus, it will be seen that this question is a difficult one to answer, even merely in regard to which cases are really closed and which are really open. But when we come to the "pseudo-closed" cases, our difficulties are much greater still.

Each day tuberculous subjects are being reported and report themselves as having closed tuberculous lesions, who are expectorating nevertheless. They swallow their sputum, some by way of deception, which they believe not to be fraught with any serious consequences, and to avoid the bother of expectorating; others, through ignorance, for having from the beginning got into the habit of not expectorating, they have unwittingly become trained in this course to such a degree that they not only do not expectorate, but do not even cough. The mucous discharge becomes detached, travels upward, and then passes into the stomach without any perceptible act of coughing. These patients are really acting in good faith. There are some patients who never expectorate, who even delude themselves into believing that they do not cough, and yet in whom at the first examination one finds a cavity with cracked pot sound!

How often have I seen such tuberculous subjects, whom the most cursory examination would necessarily place in the open class, and whom I have taught to expectorate merely by informing them that they *should* expectorate! Within twenty-four hours their closed tuberculosis had become transformed into an open tuberculosis, to their great astonishment.

The conclusion to be reached from all this is that before asserting that a given tuberculous focus is closed, a thorough examination must be made.

Swallowing sputum is always a most unwholesome practice.

The sputum of consumptives contains putrid matter which, upon reaching the stomach and intestine, undermines the appetite and digestion, and quite often brings on diarrhea. All physicians have seen digestive disturbances and diarrhea in consumptives cease as soon as the patients, accustomed as they had been to swallowing their sputum, learned to expectorate to the exterior. Besides, the sputum contains tubercle bacilli, and it is generally recognized that these organisms, if they escape the destructive effects of digestive ferment action, may become implanted in the intestine, thus inducing tuberculosis of this organ.

It is not by any means proven that the swallowing of sputum is the usual cause of tuberculous enteritis. Indeed, study of the intestinal lesions, especially as regards their pathological structure, points rather to infection of the intestine from the blood stream than through the alimentary canal. Since it is at present impossible to assert definitely that intestinal tuberculosis cannot be acquired from sputum, it is much the safest plan to avoid swallowing the mucous bronchial discharges.

Some conception of the capacity of tuberculous sputum to resist putrefaction and destruction may be gained from the fact that in the vomitus of many consumptives the sputum is found intact for a considerable period of time.

Danger to the patient attends, then, the swallowing of his sputum. Consequently consumptives must expel their lung discharges to the exterior.

Until the time when the infectious nature of tuberculosis had been plainly demonstrated and accepted by the medical profession, no one paid any attention to what became of the tuberculous sputum. The patient spat on the floor, or into his handkerchief, without any thought of the matter.

Now that it is quite certain that the sputum of consumptives is the agent in the transmission of the disease, however, it is the duty of every tuberculous subject, after being informed of the nature of his illness, to avoid scattering his sputum promiscuously. Since the sputum contains the noxious bacilli by the millions, he should not even let traces of it become disseminated.

Hence the necessity of the consumptive expectorating in a cleanly manner and carefully collecting his sputum.

He should use some form of receptacle made of an impervious material, and hence easily washed. The simplest plan is to have a porcelain cuspidore at the bottom of which a layer of water is always kept in order to prevent desiccation of the purulent matter as well as to facilitate cleaning. In the home, nothing is easier than to have one of these receptacles on the floor or on a table always within reach both by day and night.

Out of doors, however, the problem is less readily solved. Patients at liberty, with their customary carelessness and ignorance, regularly expectorate on the ground or into a handkerchief. The bacilli reaching the ground, once dried, become disseminated in the air and constitute a factor in the general transmission of the infection. Bacilli dried in a handkerchief are carried back to the patient's home and contribute more particularly toward infecting the family, friends, servants, and laundresses.

In institutions in which consumptives are systematically taken care of, conditions are altogether different. The patient there is forbidden to expectorate on the floor or into his handkerchief. Every patient is provided with a pocket sputum cup. In this manner, the sputum never becomes disseminated.

The *pocket sputum-cup,* which is the only means so far known of preventing transmission of tuberculosis by the expectorated bacilli, and indeed, the only effectual prophylactic agency, was originally used in Germany. I believe I was the first to introduce it in France, in the year 1889.

The cup which has long been, and is still, in use is that of Dettweiler, of Falkenstein-im-Taunus. It consists of a small flask of blue glass, well-shaped, provided with metallic fittings which allow of its being hermetically closed, turned upside down without loss of its contents, and very easily cleaned. Following Dettweiler, dozens of different models of pocket sputum-cups have been placed on the market, some less expensive, others with the claim of being more easily disinfected. No improvement upon the original cup, however, has actually been made, and for my part, I have always continued to prefer its use.

Granting that the tuberculous patient is provided with one of these various sputum-cups, he must not proceed to render it useless by a faulty method of expectorating. He must, with its assistance, collect all his sputum and not let even traces of it escape.

To expectorate cleanly, he must wait until the sputum has been well gathered in his mouth, and then gently expel it into the cup. With due care, he can avoid allowing any stray droplets or splashes from reaching his hands and clothes. When at home, he may take the further precaution of rinsing his mouth afterwards with a mouthful of water, which is then to be likewise passed into the sputum-cup. For if, after having expectorated, he at once wipes his mouth with his handkerchief, the latter is almost sure to become infected.

This latter precaution of rinsing the mouth and lips is especially important in the case of patients who are con-

stantly in the habit of kissing other members of the family. Tuberculosis may, indeed, be transmitted in this manner to the skin of the face.

It must be recognized that, as regards residual bacilli about the lips, a man wearing a mustache is much more dangerous than members of the opposite sex. One may take it for granted that in tuberculous patients with a long mustache the region of the mouth is always more or less infected with bacilli. Indeed, men should always have their mustache shaven off, or at least cut close to the skin of the upper lip. Under such circumstances, with special care as to cleanliness, the likelihood of dissemination of the germs from this source is reduced as much as possible.

The day and night sputum, thus carefully collected, must be destroyed. Three procedures are mainly in use for this purpose: Strong chemicals, heat, and putrefactive processes in privies.

So-called antiseptic fluids placed in the bottom of the sputum-cup are not to be too greatly relied on, for the dense, voluminous sputum masses are only very slowly penetrated by these fluids.

Destructive acids or other caustics are always rather expensive and unpleasant to use in the home.

Where there is a privy, the contents of the sputum-cup and the water used in cleansing it may be merely poured out.

The sputum may also be poured daily into a water-tight jar containing sawdust. A pasty mass is thus formed which can be burned from time to time.

Our present procedure is to destroy the virulence of the sputum by mixing it with soda lye and by heating the resulting rather thick fluid to boiling for fifteen minutes.

### VI. Hygiene of the Urinary Secretion.

In tuberculosis as in all other disorders, systematic observation of the condition of the urine by the physician is an important matter, not only at the beginning of a course of treatment but throughout its duration. At the outset such observation is of diagnostic value; later it may afford both prognostic and therapeutic indications.

The physician should, in the first place, make sure that his patient is passing neither albumin nor sugar.

At the present time, creosote and allied substances being in current use, often in high dosage, almost daily examination of the urine is a necessity, in view of the information to be derived in particular from its coloration during rather intensive creosote treatment.

Apart from the drugs capable of imparting to the urine a more or less pronounced smoky color, I have in several instances noticed a brown color of the urine in consumptives who were not being given any drugs. The clinical circumstances in the presence of which these observations were made were so dissimilar that I have not as yet been able to establish any relationship between these cases. The problem is still under study.

Among tuberculous patients free of fever, after the first examination of the urine has shown it to be practically or quite normal, little further attention need be paid to it unless some acute disturbance arises.

Urine examination is of some importance in connection with the possible harmful effects of the treatment by overfeeding, for whereas the tongue may be held to reflect the condition of the stomach the urinary secretion may be considered to reflect the state of nutritive equilibrium. In patients receiving a quantitative or qualitative excess of

food, and in whom, therefore, the disturbances already described in a previous section are imminent, it is very common to see the urine give warning of the existing danger, either in its color and various other characteristics, or, especially, through its greatly increased specific gravity.

Urine examination in the clinical study of consumptive cases daily enables the physician to detect the initial evidences of incipient hepatic disturbances. In subjects predisposed through inheritance to congestion or infections of this organ, the least disorder in the gastro-intestinal functions may give rise to a secondary reaction in the liver, marked by the appearance of bile pigments in the urine, even in the absence of any trace of jaundice. Mild chronic appendicitis with occasional subacute attacks, so common among the tuberculous, often betrays its presence both by spontaneous local tenderness to pressure with the finger, with or without distinct functional disturbances, and by a discoloration of the urine with bile.

Patients, either with or without fever, often take special notice of the dark coloration and turbid appearance of their urine, and likewise of the various sediments which form in it upon cooling.

Among these sediments there are some, usually colorless, that are produced through the abnormal precipitation of carbonates and phosphates of lime. These have assumed marked diagnostic importance because they constitute evidence of losses of the alkaline salts from the system and indicate, according to prevailing conceptions, "remineralizing" treatment. For practical purposes, however, it is necessary to distinguish between temporary alkaline sediments and permanent sediments, the latter alone being of significance.

Besides allaying the patient's fears by telling him that these deposits are due to the fever and that matters will be different as soon as the fever has improved, the physician should also seek prognostic and therapeutic indications in these urinary findings.

Milk administered as a supplementary food between meals serves to facilitate the process of renal filtration and consequently the elimination of organic poisons; to increase the output of urine, and to reduce its dark coloration as well as the subsequent sedimentation, thus exerting a favorable psychic effect upon the patient.

A small amount of some natural alkaline mineral water taken with the meals for a few days will likewise contribute to this result.

In general, as soon as a patient is confined to bed on account of some added febrile condition, I have him take during the day a reasonably large amount of milk, such as 1 liter to 1½ liters, always for the specific purpose of facilitating organic detoxication through the renal emunctory.

There remains to be pointed out the extraordinarily frequent appearance among consumptives of both sexes of kyestein, forming a rainbow-colored film over urine passed a few hours previously. Many patients exhibit this peculiar phenomenon as soon as they are subjected to overstrain; others show it as soon as any unusual pathological disturbance appears to interrupt the previously more or less sluggish course of their lung affection.

### VII. Hygiene of the Menstrual Period.

Many women, without being tuberculous subjects, are compelled to remain abed during their menstrual periods. Obviously, if these women contract tuberculosis, their customary practice in this connection should not be disturbed.

But there is besides a whole group of tuberculous patients who must be ordered complete rest in bed at these times. As a rule, these are the women who, when menstruating, show more or less marked congestive manifestations in some organ other than those of reproduction.

Without going into details concerning the probable pathogenesis of these manifestations, it will be sufficient to state that the disturbance most to be feared during the menstrual periods is hemoptysis, the lung being, in tuberculous women, the weak point upon which the congestive influence is expended.

Not a few phthisical women regularly show a few streaks of blood in their sputum at each menstrual period. Others suffer from actual hemoptysis, more or less pronounced.

Up until recent times, the procedure followed to prevent or at least attenuate this complication was regularly to order complete rest in bed as soon as the initial signs of it appeared. When a woman had once brought up any noteworthy amount of blood at one of her menstrual periods, she was placed completely at rest for several days before the onset of menstruation and the various customary drugs credited with the property of reducing the so-called reflex circulatory disturbances of uterine origin were administered.

A series of observations yielding constant results over a long period of time have, however, led me to the conclusion that, on the contrary, in the great majority of instances, there is definite advantage in allowing these patients to take a moderate amount of exercise, or at least, to remain out of bed as though nothing unusual were taking place. I only place at rest those who develop serious disturbances, either

in the form of abdominal symptoms, fever, or lung complications.

Further mention of this will be made in the section on hemoptysis.

The majority of tuberculous women, however mild the disease, find the onset of menstruation marked by a more or less pronounced rise of temperature. The thermometer frequently shows a rise of 0.5° to 1° C. two or three days before the period. Again, not a few patients, ordinarily showing only 37° or 37.5° C. every evening, exhibit an evening rise to 38.5° or 39° C. (101.3° or 102.2° F.) for six or eight days before menstruation. This premenstrual fever subsides, as a rule, as soon as the menstrual flow sets in.

The menstrual fever exhibits very variable characteristics. Where it precedes the flow, it may drop for twenty-four hours just before the flow, and then return as soon as the latter has begun.

It may, instead, appear at about the same time as the flow and subside as soon as the latter has terminated.

It may be almost or quite absent before and during the flow and appear just after it has been completed, lasting five, six, or eight days thereafter (post-menstrual fever).

In the most severe forms it may, while maintaining practically equal intensity throughout its course, precede, accompany, and follow menstruation, forming a curve extending over twelve to fifteen days, or even longer, leaving the patient but one week's rest per month.

The onset of tuberculosis in a woman often results in menstrual disturbance. There may be either intermittent suppression or complete suppression, even during the earlier stages of the disease. These patients should be told that their periods will become regular again and resume

their usual amount as distinct improvement in their general condition takes place under treatment.

I am in the habit of telling these women that their menstruation will return as soon as they shall have deserved it.

The best plan to follow, indeed, is to abstain from all measures specially calculated to bring on the menstrual flow.

It may happen, however, that women who have not had any menstrual flow for several months nevertheless exhibit at each period, when the flow should have appeared, nervous disturbances and local pain showing that the menstrual molimina are still operative.

This effort on the part of the system, which does not result in the usual menstrual flow, should at times be assisted by appropriate external and internal measures, the nature of which is well-known.

Among the other disturbances which not infrequently make slight or serious trouble at the menstrual periods in tuberculous women, mention will here be made only of the so-called *"menstrual diarrhea,"* which is of such frequent occurrence and deserves to be kept in mind.

Many women considered healthy suffer from diarrhea at some time or other during their menstrual periods, and not a few with inveterate constipation secure really satisfactory evacuation only once a month at these particular times. This is a well-recognized fact.

But among the tuberculous patients, there often thus arises a serious difficulty.

Even with the menstruation apparently normal in every respect, there may be passed on the day before the flow, or the day before that, or on the same day, two or three liquid stools. In other instances, diarrhea appears after the flow has already set in.

Where, however, the patient suffers from any form of dysmenorrhea, there may be observed before, during, or after the period of the (insufficient) flow, a much more severe diarrhea, with, *e.g.*, 8, 10, or 15 stools in the twenty-four hours.

This intestinal flux, more or less watery, taking place with or without slight colicky pain, and as a rule without tenesmus, does not actually fatigue the patient unless it is inordinately frequent.

Yet it may be highly distressing, of dysenteriform type, and attended with the evacuation of bloody, slimy stools during the twenty-four or forty-eight hours preceding the menstrual flow. After the latter appears, the trouble passes off completely.

Finally, in certain patients, young girls or women, who menstruate very irregularly, one not rarely finds that a menstrual period, the oncoming of which was marked as usual by a rise of temperature, abdominal and lumbar pain, and the customary congestion of the disease foci in the lung, completely fails to appear and is replaced by a diarrheal flux, manifested in 6, 8, or 10 liquid stools a day and lasting for two or three days. The condition then present is an actual *vicarious* menstrual diarrhea.

Under these circumstances the most logical procedure in such an excessive secretory outburst from the bowel, thus transformed into an "issue," is to adopt expectant treatment; indeed, the only rational measure possible as regards suppressing the abnormal flux would be to treat, if it were practicable, the dysmenorrhea itself.

## CHAPTER VII.

### TREATMENT OF CERTAIN COMPLICATING MANIFESTATIONS IN TUBERCULOSIS.

CONSUMPTIVES under treatment, even when comprised among the eminently curable cases, may at some time or other be seized with certain major or minor complications in the presence of which it is highly necessary for both the patient himself, the persons in his immediate vicinity, and the physician to keep their heads and not jump to the conclusion—especially the family—that things are turning out very badly and all hope is lost.

The disturbances which make their appearance as a result of overstrain will be first taken up.

#### I. Complicating Disturbances Due to Overstrain.

These disturbances constitute a most interesting phase of the clinical history of tuberculous patients.

It should not be concluded, from the fact that a number of these disturbances are best observed in patients undergoing the rational hygienic treatment, that they are of significance only as medical curiosities. On the contrary, they are of distinct importance to the practitioner called to see for the first time a consumptive subject living at liberty—which means nearly always in a constant condition of overstrain. It is, indeed, to this group that belong the vast majority of tuberculous cases, the remaining few being either aggregated in sanatoriums or, in still rarer instances, undergoing the rest treatment in individual seclusion.

Nothing is more dissimilar to a consumptive left to his own devices than the same consumptive under sanatorium treatment.

When at liberty, the tuberculous patient exhibits in maximal intensity all the symptoms that the actual diseased areas in his lungs may produce, all the reactions of a general order they may evoke, and all the complications that may succeed them.

His entire organism is in a constant state of irritability, all his functions have lost their equilibrium, or at least are upon a most unstable basis; nothing goes on in a regular manner, everything is vitiated; the secretions are abnormal, and the emunctories delayed; there exists a general congestive condition of all tissues, an obstruction to all functions, and all this is apparent in the patient's facies and can be guessed from his outward aspect.

This same tuberculous patient, subjected to the rest cure, finds three-fourths of all his discomforts, great and slight, disappearing as if by magic. Within a few days, even before any gain in weight has set in, he is completely transformed, cleaned up, decongested, and becomes an entirely different person, both to himself and to those about him.

The cause of this morbid condition of the consumptive when at large is overstrain; suppression of the latter through rest, on the other hand, accounts for his subsequent transformation.

Outwardly the most striking manifestations of this fatigued state are, accentuation of the fever over and above the level that may be considered normal in the individual case, shortness of breath, cardio-vascular excitement, tachycardia, exaggeration of the cutaneous vasomotor phenomena, exacerbation of cough with its direct or reflex

effects upon the stomach, increase of expectoration, sleeplessness, dreams and nightmares, profound anorexia, etc. —all symptoms indicative of intense intoxication by the poisons of organic wear and tear superadded upon the continuous intoxication by the poisonous products of the disease itself.

To these outward manifestations correspond a host of other inward or local phenomena which the physician may observe practically anywhere in the system and which mark the reactive effects of overstrain upon various structures, such as the lungs, larynx, bowel, liver, etc.

As for the lungs, to which special attention may here be appropriately paid, the lesions detected in them by auscultation are more extensive than the actual tuberculous disease itself; a special congested, obstructive condition of the latter has been induced by complications of non-specific origin.

These manifestations of fatigue, alike general and local, require consideration from two different aspects. Thus, they constitute a permanent, chronic state in the consumptive living at large—being superimposed upon his primary disease and becoming merged with it, as it were. On the other hand, they are accidental, casual, and acute in the consumptive at rest, temporarily subjected to overstrain from some cause or other.

**Fever Due to Overstrain.**—In explaining this condition, a concrete illustration will serve better than any sort of description.

An ambulant tuberculous subject, previously left to his own devices, and living under the same conditions as everyone else, is sent to the sanatorium. He still possesses more or less physical strength. His pulmonary lesions are fairly localized, as a rule. Partly owing to

fatigue from the trip, he exhibits, on the evening of his arrival, high fever, the oral thermometric reading being often 39° or 39.5° C. (102.2° or 103.1° F.). Upon inquiry we find that ordinarily he feels hot every evening and sweats to some extent every night.

We allow him to sleep with the window closed for the first night or two. Next morning, the thermometric reading is 36.5° to 37.5° C. (97.7° to 99.5° F.). If it is 36.5°, he is sent out for open air treatment on the same day; if 37.5°, he is kept in bed for twenty-four hours and generally by the following morning he has reached his "normal" morning temperature, which is thereafter maintained. He is ordered rest, as complete as possible, on the veranda.

The first evening he still shows 39° or 38.5° C. (102.2° or 101.3° F.); the second evening, he is down to 38° C. (100.4° F.); finally, after five or six days at the most, he comes down to his "normal" evening temperature, *viz.*, 36.8° (98.24°) or even 36.6° C. (97.88° F.) by the mouth.

On the third night, moreover, the window having been left open, he had no sweat. His urine, at first highly colored and yielding a heavy sediment, increased in amount and became pale and clear. While outdoors, he was never rendered uncomfortable by his fever. By the third day, on an average, his appetite became excellent.

Here, then, is a tuberculous patient who for some time has been having a more or less pronounced vesperal fever. Four, five, or six days, or at most a week, of air treatment and rest have rid him of his temperature, and brought him back to complete apyrexia.

Such is the general type of the fever due to overstrain. Of course, the fever varies in intensity and duration. I do

not believe I have ever seen it last longer than a week. When vesperal fever fails to yield to strict treatment within a week's time, the chances are many that it deserves a different name.

This fever due to overstrain is a serious matter in patients at liberty because as long as it lasts it exhausts the patient and keeps him from eating; because there is no reason why it should ever cease, and because little by little it merges with the true tuberculous fever. It disappears, however, as soon as it is properly treated.

The appropriate treatment for it is suggested by its very cause, and is *rest*. Nothing else is required; it is the necessary and sufficient remedy.

This accounts for the fact that treating such fever with any drug whatsoever fails unless care is taken to immobilize the patient; hence also the fact that drugs have an admirable effect on it, provided rest is ordered from the start.

The preceding account constitutes practically a summary of all cases of permanent fever from overstrain among patients who should be free of fever if they were subjected to the rest treatment.

Tuberculous subjects without fever are, however, in the minority. In the majority of instances the fever from overstrain is observed as a complicating state in a patient already febrile from true tuberculous fever. This is, indeed, an everyday observation.

A patient living at his own discretion, but already accustomed to taking his temperature morning and evening, comes to the physician with his temperature records in his hand. The line of average temperature lies between 36.9° C. (98.42° F.) in the morning and 38° C. (100.4° F.) in the evening. After a few days of rest, the line of average temperature is lowered to between 36.5° C.

(97.7° F.) in the morning and 37.3° or 37.5° C. (99.14° or 99.5° F.) in the evening. The rest treatment causes the excess, representing the increment of fever from overstrain, to disappear.

Thus, whether this wear and tear fever occurs alone in a patient who should instead be afebrile, or whether it is present as an added factor superimposed upon the fever of a regularly febrile patient, it appears always in the same form and is amenable to the same treatment.

As a corollary to the above, it should here be noted that the *true tuberculous fever*, resulting directly from activity of the tuberculous lesions, is observed independently of all other factors and in a pure state only in the consumptive undergoing rest treatment, regularly febrile patients living at their own discretion always having in addition a surplus of temperature due to overstrain. Their temperature is always higher than it would be after a few days' rest, with resulting elimination of excess fever.

Let us now see how the *accidental,* casual form of fever from overstrain shows itself clinically.

This is the form of fever which occurs for some reason or other in a patient undergoing rest treatment, whether he is otherwise free of temperature or already has true tuberculous fever. Febrile tuberculous subjects, whether their temperature be 37.2° or 38.5° or 39.5° C. (98.96°, 101.3°, or 103.1° F.) in the evening—always having an unstable temperature—maintain their temperature, through intelligently applied rest treatment, at this level, which may be spoken of as their "normal" level. The least undue exertion, however, upsets the temperature equilibrium and causes the temperature to rise.

A walk somewhat longer than usual, especially in the afternoon, the mere fact of writing a few letters, excite-

ment through participation in some game or other, prolonged conversation, an unduly lengthy visit by a friend or relative, and in many patients even a simple emotional impression of any sort, may induce a rise in temperature which may persist even until the next morning.

Tuberculous patients removed to some distant locality afford the best examples of accidental fever. The journey is sufficient to throw their system into a state of chaos; they often develop high fever; the urine is of high specific gravity and deeply colored, and a congestive condition is induced in all their tissues. It is but natural, indeed, that this should be the case among these patients already in a state of unstable equilibrium, when we see the same manifestations of general tissue congestion occurring in the healthy human subject under like circumstances. The consumptive is like the diabetic patient or the albuminuric patient, who, when on a long journey, is threatened with various complications.

This accidental form of fever from overstrain likewise requires but one form of treatment, *viz.,* rest.

As a general principle, then, it may be stated that accidental overstrain in the consumptive causes a rise in temperature, or is a factor tending toward *hyperthermization.*

To this rule, however, there are curious exceptions. In certain cases, otherwise apparently in no wise different from the others, the opposite result occurs, *i.e.,* overstrain acts as a factor of *hypothermization.*

This form of paradoxical reaction is worthy of more detailed description. A concrete example will afford the reader a general conception of such cases.

A youth 18 years old, growing with excessive rapidity, having contracted tuberculosis as a sequel to "la grippe," has been having fever for three months, the average being 37.4° C. (99.14° F.) in the morning and 39° C. (102.2° F.)

in the evening. In the way of tuberculous lesions, there is a large cavity on one side and extensive infiltration of the opposite lung. There is marked loss of weight and persistent diarrhea. The patient is sent to a sanatorium, the journey being of nine hours' duration. After a night's rest, his temperature is 36.5° C. (97.7° F.) and the pulse rate 96. On the evening of the same day, the temperature is the same; the next morning, 37° C. (98.6° F.), and the next evening 38.7° C. (101.66° F.). On the succeeding days he resumes a temperature of 37.4° or 37.5° C. (99.14° or 99.5° F.) in the morning and 39° C. (102.2° F.) in the evening, with a permanent pulse rate of 120 or 130.

The above constitutes a typical example.

I have seen patients with cavities, after a journey lasting eighteen to twenty-four hours, show barely 37° C. on the evening of arrival and twenty-four hours later return to their customary temperature of 38.5° or 39° C. (101.3° or 102.2° F.).

These evanescent states of hypothermia, seen to a pronounced degree after the overstrain due to a long trip, are met with rather frequently, but to a minor degree, among patients undergoing the rest treatment. Some consumptives, but slightly febrile, regularly showing temperatures of 37.4° or 37.6° C. (99.32° or 99.68° F.) in the evening, show only 36.7° or 37° C. (98.06° or 98.6° F.) after a somewhat unusually long walk taken between 4 and 6 P.M.

I have observed afebrile patients, with evening temperatures of 36.6° or 36.8° C. (97.88° or 98.24° F.), who, after taking a walk in the afternoon, showed only 36.2° C. (97.16° F.) or even barely 36° C. (96.8° F.). Here is a striking example of this sort:

A patient with fibroid tuberculosis of both apexes, completely afebrile, spent a number of afternoons carrying his

gun about and shooting birds. As a general rule, after each of these outings, the axillary temperature was but 35.5° or 35.6° C. (95.9° or 96.08° F.).

Explanations for occurrences of this type are not lacking, but it is my intention here to write entirely of clinical facts. The main thing is to bear in mind that this temporary, apparently paradoxical, hypothermia may occur from the operation of causes which as a general rule induce hyperthermia.

**Congestive Disturbances of the Lesions in the Lungs and Pleuræ.**—Like fever from overstrain, congestion of the diseased areas in the chest may occur either as a permanent or an accidental condition. Instances of the first order are observed daily by sanatorium physicians who receive patients previously living at their own discretion. I shall here make mention of a few concrete cases.

A man 38 years old, a busy merchant in Paris, arrived at the sanatorium with the following symptoms: Copious purulent expectoration; moist râles over the whole extent of the left lung, anteriorly and posteriorly, with a small area of softening below the clavicle; bronchial breathing in the supraspinous and infraclavicular fossæ; on the right side, diffuse moist râles; evening temperature, 37.5° to 38.5° C. (99.5° to 101.3° F.). This condition was not of the accidental variety, the patient having remained at work and been in the same state for months.

The effects of rest treatment were, that without noteworthy increase of weight, within two weeks the lungs were "cleaned up" and the auscultatory signs were reduced to râles over the very restricted focus of softening in the left apex. Five months later, the patient was expectorating only once or twice, in very small amount, in the morning.

Another case: An artillery officer, 40 years old, came to the sanatorium in an extreme state of emaciation; at the right apex was a cavity apparently of the size of a hazel nut, with the entire lung filled with râles down to its base; the left apex showed bronchial breathing, with crackling râles below the clavicle. Evening temperature, 38.5° to 39° C. (101.3° to 102.2° F.). After one week's treatment, the fever receded to 37° or 37.5° C. (98.6° or 99.5° F.) in the evening, the lung signs were reduced to the evidences of the cavity on the right side and to a small focus of infra-clavicular crackling râles on the left. The patient rapidly gained weight, and six months later was an apparent cure.

A final example: A young man of 30 years, entirely afebrile, yielded signs of diffuse infiltration in the upper two-thirds of the right lung; on the left, there were the same signs, more widely disseminated, with moist râles in all affected areas.

After a week's rest, the right lung was completely "cleaned up"; on the left the signs of harsh breathing, with a few crackling râles, were entirely confined to the apex, and the sputum was reduced to two or three small purulent masses in the morning.

Phenomena of lung congestion in some degree or other are the rule in patients who are constantly in a fatigued condition.

The manifestations of *chronic pleural fatigue* are of no less interest, particularly in tuberculous cases exhibiting a bacillary focus at one apex and a dry pleuritis over a part or the whole of the same side of the chest—a most common clinical condition. Here is a characteristic instance of this type:

A robust man of 35 years, leading an active life in Paris, had for a long time been harboring tuberculosis in

the form of a well circumscribed focus at the right apex, complicated one year previously by pleurisy on the same side. Upon his arrival at the sanatorium, there was noted a very small bacillary focus above the right scapular spine, obscure breath sounds throughout the right lung, and in the lower half, at least, fine, moist sounds readily referred to the outer pleural surface of the lung. Vesperal temperature, 37.2° C. (98.96° F.). After two days of almost complete rest, all the pleural sounds had disappeared. There remained only the indistinct breath sounds.

This example is sufficient, as it summarizes all other cases. Among patients with superficial tuberculosis, whether pleuro-pulmonary or pleural alone, one observes a rapid clearing up of lesions that are sometimes very extensive. Chronic lung fatigue may also find expression in *chronic hemorrhage,* as in the following instance:

A consumptive 38 years old, with a bacillary focus and softening in the upper third of the left lung, had left his business in the fall to spend the winter in the south of France. Already for a long period he had been almost continuously expectorating blood-laden sputum. The constantly brick-red sputum often showed pure blood. The temperature ranged between 37.5° and 38° C. (99.5° and 100.4° C.) every evening.

Reaching the southern resort, the patient doubtless paid little attention to his physician's advice, for he continued tiring himself by remaining on his feet and taking walks for the avowed purpose of getting up an appetite. Hemorrhage kept up for three months. Completely discouraged, the patient came to the sanatorium in a rather pitiable state. Four days of complete rest stopped the hemorrhages, and the brick-red discoloration of the sputum likewise passed off.

In view of the usual marked variation in the auscultatory sounds on different days and even at different times the same day among most consumptives, it is not always easy to detect the minor evidences of tissue congestion in a tuberculous lung focus following temporary fatigue. In some cases, however, auscultation reliably reveals it, even in its mildest form. In the more severe forms, the condition is a definite congestive attack with or without blood-streaked sputum, and is easily discovered upon examination of the chest.

A frequent event, however, is the finding of the auscultatory signs of simple pleural or pleuro-pulmonary fatigue in patients actually suffering from tuberculosis of the pleura. In the majority of instances, these so-called dry pleurisies are accompanied by a bacillary focus in the lung parenchyma and by a catarrhal condition of the outer layer of lung tissue underlying the dry pleurisy. These patients, placed on rest treatment, more or less quickly dry up the pleural or subpleural exudates corresponding to their diseased area, and this is followed by adhesions of the lung and pleura—a process progressing all the more rapidly, the more pronounced the gain in weight and general resisting power of the individual.

Now, as a result of undue exercising of the upper extremity on the same side, an apparently dry pleura or pleuro-pulmonary surface may be observed to become moist again within a few hours. This may occur without any rise of temperature, without cough, and without any constitutional reaction, as in the following case:

A young patient with pleural tuberculosis, after all signs of moisture in the diseased pleura had disappeared, one evening indulged in a game of billiards. Being quite unfamiliar with the game, he put his shoulder (that of the

affected side) into his strokes. Next morning, I happened to listen to his chest, and was greatly surprised to find the upper half of the pleura in a state of moisture. In forty-eight hours the pre-existing dry condition was restored. A few weeks later, as though anxious to confirm his earlier experience, he played billiards again; the same effects ensued, but this time, in addition, there was slight hemoptysis twelve hours after. Again, no lasting ill-effects followed.

I have observed the same phenomenon, with constitutional reaction, in a patient who had been throwing snowballs during the day. In another case, under the same circumstances, hemoptysis followed.

This return of pleuro-pulmonary moisture may even follow apparently much more trifling exertions.

A young man at the head of a large business concern stated that it was absolutely essential for him occasionally to write letters for three hours at a stretch. After each one of these epistolary excesses, he was seized with rather severe pain in his diseased right apex; the upper half of the lung developed moisture, and the ultimate effect was sometimes hemoptysis. Needless to state, the temperature went up on these occasions. As is well known, the temperature commonly rises 0.5° to 1° C. in tuberculous patients who have been writing letters at length, even in the absence of any local sign of disturbance.

I have observed the same phenomenon of pleuro-pulmonary fatigue in a young woman with adhesions about the right apex who had spent an afternoon industriously engaged in tapestry work.

The harmful effects of shooting off firearms on lesions of the corresponding apex are well known. One young patient under my care, an enthusiastic hunter, insisted upon

going hunting once a week, in spite of my warnings. Regularly, upon returning home in the afternoon, he brought up a little blood. All improved varieties of kickless firearms were tried for him, but without result. Finally, as a result of repeated hemoptysis, his condition grew worse, and he succumbed.

Playing the piano, violin, or wind instruments has many times been responsible for like unfortunate results.

All these examples belong to the group of the congestive disturbances with or without fever, with or without pain, and form a complete, graded series from a simple moist condition of previously dry lesions to one of hemorrhage-producing hyperemia.

Obviously it is necessary, however, to recognize two distinct varieties of cases. In the one, the hemorrhage is or appears to be purely of congestive origin, while in the other, it is actually traumatic, resulting from rupture of pleuro-pulmonary adhesions not as yet firmly established. These cases of blood-spitting from rupture, very frequently met with among consumptives indulging in undue exercise of the upper extremity on the diseased side, are outside of the field of the cases now under consideration.

**General Aspects of Fever.**—From all the above facts, the general conclusions may be stated that consumptives living at their own discretion present a clinical picture apparently more serious than it actually is, for the sole reason that the fatigue undergone every day induces and maintains to an exaggerated degree all the constitutional and local symptoms attending their tuberculous involvement; that after a wholly accidental, casual overstrain the consumptive undergoing rest treatment may likewise develop all these exaggerated and superadded symptoms, and that, regularly, rest is the rational, effective, and sufficient

method of dealing with these effects of overstrain, whether they be continuous or simply temporary.

The physician confronted for the first time with a tuberculous subject living at his own discretion is face to face with real difficulty if he wishes to make an exact diagnosis of the situation. Indeed, it is impossible for him to tell precisely the relative extent of the fixed lung lesions and the congestive lesions. I have even pointed out that, through paradoxical congestion of the lungs in the presence of local phenomena from overstrain, one may readily mistake for the more seriously diseased side the opposite side, which sometimes presents quite insignificant lesions.

Nor can one be any more dogmatic in making assertions as regards the fever in the individual case.

If necessary, one may legitimately state that in all probability a given patient's fever will subside in a few days, when the effects of overstrain have passed off owing to the rest treatment.

A great mistake may, however, be made in considering almost or quite afebrile a consumptive who, after being fatigued by a long trip, is temporarily exhibiting a subnormal temperature. Doubts as to the reliability of this absence of fever may be corroborated by the patient's previous history, and especially, by an immediate comparison of the temperature with the clinical symptoms and signs as a whole. There are, indeed, some consumptives with extensive lesions whose regular evening temperature barely reaches 37° C. But these cases are far from common. The physician cannot fail to have his attention aroused by the manifest lack of harmony between the existing relative lack of fever or actual hypothermia and the serious degree of lung involvement—not to mention other indications elicited from the patient's general condition.

The medical man must therefore be very guarded both as to the prognosis and the detailed diagnosis. Not that there is any great disadvantage in taking a somber view of the consumptive's condition and imparting this view to the family, since the family is usually in an unduly optimistic state of mind; the physician must, however, make it known that a given patient, who at first would seem to justify a very unfavorable prognosis and appear doomed to early death, may rather readily, if he is subjected to the rational course of treatment, be so changed in a few weeks as to seem about, or actually be about, to take on a new lease of life.

Among the laity there is a marked tendency to accuse of ignorance the physician whose prognosis has been proven faulty by the subsequent course of events, whether the result be complete recovery or merely unexpected improvement.

In no other disease are there encountered instances of such surprising improvement under most various forms of treatment—provided these measures are new to the patient and the patient undertakes their application with confidence in the results to be obtained.

Apart from any psychic effect, however, rest is unquestionably the most powerful means at our disposal to restore vitality to the tuberculous organism. Rest alone is sufficient to overcome the fever from overstrain, to decongest the diseased areas in the lungs, to clean out all tissues poisoned by the toxic wastes of organic activity, and to restore to the patient the ability to take adequate nourishment.

Under these circumstances all remedies prove successful provided they be not harmful, for the improvement taking place would have appeared without their help. It is well

to be thoroughly imbued with these facts, in order to be able to appraise correctly any apparent rapid improvement in consumptives and to gain a true idea of the value of remedies in vogue at the time.

## II. Hemoptysis.

Hemoptysis may be defined as the expectoration of blood. The term is applicable, however, only when the blood is derived from the lung. When a tuberculous subject shows blood in his sputum, therefore, the first thing to be ascertained is whether this blood has actually issued from the lungs. It is not always easy, upon superficial examination, to avoid mistakes in this connection.

**Sources of Blood Other than Hemoptysis.**—Some patients have sensitive gums, and without being aware of it make them bleed in the morning, with consequent discoloration of the sputum. In this event, it is sufficient to note that the blood does not actually form part of the sputal mass, that it is contained rather in the saliva, which is more or less frothy, and finally, that the patient is able to make his gums bleed at will, and can thus, without coughing at all, supply a fresh amount of blood-stained saliva.

Other patients, especially upon awaking, but also sometimes during the day, expel purulent and bloody mucous discharges from the pharynx. As a rule, chronic rhinitis is at the bottom of this condition. At night, the blood exuded in the posterior portions of the nasal cavities becomes mixed with mucus or forms red streaks over it, and the mass travels down to the vicinity of the larynx. When the patient awakes, the mass is expelled by a cough which the patient mistakes for actual pulmonary cough.

Others expel a little blood upon blowing the nose, and at the same time expectorate blood-stained mucus.

Still others suffer from chronic pharyngitis or tonsillitis. A small mass of mucus or caseous follicle becomes detached and slight exudation of blood occurs.

Finally, in others still the margin of the larynx is inflamed, and in forcible coughing the mucous membrane becomes slightly excoriated.

In none of these conditions is diagnosis difficult, as a rule. It may happen, however, that in spite of careful examination the physician is left in doubt as to the source of the blood.

In a general way, blood derived from the upper respiratory passages presents a different appearance from that of blood coming from the lungs. Often there are bloody streaks in the midst of transparent mucus; or there may be a reddish brown streak of blood already coagulated; or, again, there may be a bright red spot which can be identified with blood the patient is able to expel from his nose by using the handkerchief at the same time.

When the blood coming from the nose or throat is mixed with purulent sputum coming from the lung, it will be noted that the lung expectoration is itself colorless and is merely spotted with red on one side, as though it had become covered with red at the moment of expulsion through the pharynx.

Whenever doubt persists in the physician's mind, he should order the precautionary measures appropriate in true hemoptysis to be instituted.

**Significance of Hemoptysis.**—Expectoration of blood from the lungs is an everyday occurrence among the tuberculous. Its occurrence is in itself, as a rule, of no great significance, though it is always more or less disturbing, and makes a marked impression on the patient and his family. The psychic effect of it is always very marked. As with

everything else, however, one becomes accustomed to it upon repetition, and very often, after two or three attacks of hemoptysis, the patients bravely accept it as a matter of course—which is an excellent thing.

Among the laity great prognostic significance is attached to hemoptysis. Indeed, many unfortunate consumptives almost on their death-beds inform their physicians with glee that their case is not a serious one because they have never brought up blood. The fact is that it is quite possible for a person to die of tuberculosis without ever having seen blood in his sputum, just as a person may, on the other hand, readily recover after having had dozens of these attacks.

It is important to realize that in tuberculosis hemoptysis may come on without any apparent cause. Blood may appear in the sputum in a patient in perfect equilibrium, when at rest, out of doors, in bed, or asleep, as well as after physical exercise. It is quite useless to be always seeking a cause for this complication.

Yet it is plain that a palpable exciting cause often exists. A consumptive may bring up blood because he has exerted his arm freely; because he has sung too loudly or laughed too heartily, or has simply talked or argued with too much vigor; because he has remained exposed to the hot sun's rays without protecting his head and shoulders; because he has eaten too hearty a meal, with unaccustomed libations; because he has gone riding, driven a carriage or motor car, or ridden on a bicycle, etc.

Now, while one may feel disposed to consider these instances of hemoptysis traumatic, in a sense, it must not be forgotten that other instances of hemoptysis are the result of local changes in the pulmonary lesion and may then be entirely spontaneous. Sometimes with suppuration there is

combined a little transudation of blood; sometimes an actual hemorrhage occurs, with infiltration of blood through the lung parenchyma; sometimes a vessel becomes ulcerated and ruptures; more rarely, the condition results from rupture of an aneurysmal pocket formed on one of the branches of the pulmonary artery.

A rather frequent cause of hemorrhage is what I have termed an eliminatory suppurative attack or *"clearing out" attack,* of which further mention will be made later on. This form of hemoptysis is often copious—which is only to be expected when it is borne in mind that during elimination of a necrotic bit of tissue from the tuberculous focus a blood vessel may be opened.

**Clinical Features of Hemoptysis** —In view of the above variation in the causal factor, a number of different varieties of hemoptysis are met with.

Very often patients merely bring up a few sputa speckled with red or covered with a layer of fresh blood, and that is all.

Often, again, the blood appears in a series of sputal masses passed out in the course of one or several hours—without cough being frequent—and the whole trouble comes to an end suddenly, the customary colorless sputa replacing the bloody expectoration. This condition may persist for a longer time, even several days, without any other symptoms being present. Not a few reckless consumptives take walks while bringing up more or less bloody sputa for a variable period of time.

In other instances, pure blood issues. Cough is frequent, the patient experiences a gurgling sensation at some point in the chest, generally behind the sternum—a sensation he never forgets, once he has felt it. Blood rises to the mouth, assisted by regular jerky movements of the

thorax. This is true hemoptysis, the form which produces a distinct psychic impression on the patient.

The flow of blood lasts for a variable time, a few minutes, or a quarter of an hour, and the expulsive movements then slow down, the gurgling in the thorax stops, and the fluid, bright red blood is replaced by a few more or less formed clots, evacuated at intervals.

Often the disturbance is confined to this single paroxysm; but often, too, a new attack comes on after a variable period of rest. The evacuation of blood is resumed several times in the twenty-four hours and even on several successive days. During the intervals, the expectoration remains red or blackish. Finally the sputum gradually loses its color, in the course of several days. This represents the stage of clearing up of the bloody infiltration in the lung focus.

As a result of this disturbance, the patient is left more or less weakened, partly owing to the loss of blood, when it has been marked, but partly and in the majority of instances exclusively, to his immobility in bed, to the fatigue attending this rather forced immobilization, and to the initial mental shock, not to mention the smaller amount of food taken during the attack.

As a rule, hemoptysis is unattended with fever. During the evacuation of blood, the pulse rate rises, and a few hours later the temperature goes up a few tenths of a degree centigrade above its customary level. These, however, are nervous effects more than anything else. Occasionally the period of "clearing out" of the lung is accompanied by true fever, which, however, is of short duration.

It should be borne in mind that hemoptysis, like all disturbances associated with nervous shock, may cause the

appearance of certain manifestations commonly ascribed to inhibition.

Mention will here be made merely of a temporary or more or less persistent aphonia, disappearing suddenly just as it came, and of retention of urine, likewise temporary. This latter occurrence is much less common. Two patients in my experience had to be catheterized for twenty-four days following two attacks of hemoptysis coming on at intervals of several months.

This retention of urine is evidently allied to that observed after various forms of trauma involving any portion of the body.

So much for the milder forms of hemoptysis. There also occur grave and fatal forms.

Some are grave by reason of the amount of blood lost, their duration, or the fever coming on as they disappear.

Others are grave because they form part of a train of symptoms of unfavorable prognostic significance. There are forms of tuberculosis accompanied by almost continuous blood-spitting. Even during complete rest, blood is constantly recurring in the sputum, often with simultaneous febrile exacerbations.

Febrile tuberculosis continually accompanied by blood-spitting has always been looked upon with apprehension. These hemorrhagic forms of phthisis, whether attending infiltration of the apexes or tuberculosis of the secondary pneumonic type, actually do occur. I have had occasion to see a few such cases. Little is known, indeed, as to their pathogenesis.

For my own part, I believe that as consumptives are more systematically cared for, these forms are becoming more and more exceptional, and for many years I have rarely been seeing any. As for the hemorrhagic forms

with little or no fever, they must be quite rare if the subjects are protected from the hygienic errors so constantly committed by consumptives left to their own devices.

Finally, there is a "fulminating" type of hemoptysis. Whatever may be the pathological process underlying it—pulmonary apoplexy or rupture of a large vessel or aneurysm—the effect produced is terrifying. Within a few seconds, or at most, minutes, the lung fills, while the blood pours from the mouth and nose in streams. In certain cases, even, the blood is not expelled, but the scene is suddenly closed in a species of syncope. Fortunately these are rare occurrences.

There is one other variety of hemoptysis which is of marked interest. There are some consumptives who, with or without fever, have blood in their mouths almost constantly—sometimes actual blood, but more often purulent sputum uniformly tinged with a red, orange, or brownish color. This variety may be termed the brick-stained expectoration. From time to time, pure blood appears upon this sputum in dots, streaks, or spots, and not infrequently a true hemoptysis is superadded.

These cases are not at all rare. As a general rule, they occur because of some hygienic error. Brick-stained expectorations persisting all day are met with usually in tuberculous patients who are not taking enough rest.

Whenever I have placed cases of this type on strict treatment, the brick-stained expectoration shortly disappeared.

This variety of expectoration may, as a matter of fact, also appear as a temporary phenomenon among patients under excellent hygienic treatment. The patient, upon awaking in the morning, may bring up a little sputum tinted red or brown, without apparent cause, and the condition stop there.

Needless to state, a number of these minor forms of blood-spitting of uncertain origin, especially the instances of repeated, slight hemoptysis in the morning, are at present classed with the hemorrhages of alimentary origin.

In this group characterized by expectoration of blood in the morning should be placed a variety of hemoptysis which, in my estimation, is to be referred to a minute pulmonary apoplexy. Upon awaking, the first sputum brought up consists of a round mass of blackish blood. There may be two or three sputa of this sort, but that is all. Subsequent sputa are all colorless.

Finally, I shall mention one possibility which it is well to bear in mind in order to avoid the mistake of condemning to rest in bed patients in no wise in need of it. For periods of several days, some consumptives with free expectoration bring up purulent sputum which, while entirely colorless or greenish gray during the daytime, shows by candle or lamp light a very distinct roseate tint. This is evidently due to some condition similar to the dichroism of the bile. Without going any further into its cause, I may state merely that I have never found reason to attach any importance to it whatsoever.

**Treatment of Hemoptysis.**—When hemoptysis occurs, what measures are to be taken?

Available procedures are certainly not lacking, and everything possible and imaginable has been used at least to a slight extent in attempting to arrest the disturbance. Whence, skeptics may be apt to conclude that, no measure is of actual service. This, however, would be going a little too far.

The fact is that whereas, on the one hand, hemorrhages due to serious apoplexy of the lung through rupture of a large lung vessel or aneurysm are beyond the reach of our

therapeutic procedures, on the other hand, ordinary hemoptysis ceases of its own accord in most instances. Thus, where a given remedy seems to have contributed in terminating the paroxysm in a certain case, one is often justified in questioning whether the hemoptysis would not have stopped or did not stop spontaneously. Hence also the remarkable results from all remedies used and the surprising statistics reported by a host of authors concerning hemorrhages arrested in a few moments by such and such a remedial measure—internal or external. This likewise accounts for the fact that each practitioner has his own favorite plan of treatment for all hemorrhages, which brings him success in almost every case.

I shall not attempt to solve the question, why a hemorrhage stops. It is rather difficult to understand why, in a consumptive developing attacks of hemoptysis several times every day, hemorrhage is seen to come on during absolutely complete rest while the same patient may have gone through the act of defecation, for example, a few moments before, without any hemorrhage setting in. This is actually an everyday observation.

What, then, is to be done when hemoptysis occurs?

Upon the first threatening sign of the condition, the patient should be placed in bed at complete rest in a room to which fresh air is constantly being admitted, as is always the case with consumptives under sanatorium treatment. He should be at once given a few centigrams of opium to subdue cough. He should be required to avoid talking and to keep himself from coughing; no one should be allowed to enter the room. His food and drink must be cold; it is best to interdict hot soups. If the patient needs to go to stool, he should do so, but with a minimum of exertion. Indeed, the safest plan is to starve the patient completely, allowing

him only a few mouthfuls of water from time to time. All of the above measures should be kept up for twenty-four hours.

I see no advantage in plying the patient with ice and iced beverages, which too often induce secondary congestive reactions.

Where a threat of hemoptysis is all that is going to occur, the discolored sputum disappears in a few hours. The patient should, however, be kept under the influence of opium for one or two days. When the sputum has been quite colorless for forty-eight hours, he may get up and resume his treatment, which is made rather strict for the first few succeeding days.

Where the blood-stained expectoration persists for a time, the special treatment is continued. He patiently waits in bed until colorless sputum has returned. It is well to watch the temperature morning and evening. As for auscultation in these cases, I consider it quite useless and often prejudicial. It yields no information and is disadvantageous in that the patient is disturbed and compelled to breathe more deeply, which brings on cough. In the presence of a consumptive who is bringing up blood the first thing for the physician *not* to do is to practice auscultation. In a general way, expectancy is the proper course to pursue, the thermometer, however, being watched.

Where bloody expectoration continues for several hours I am in the habit of prescribing ergotin in a mixture of syrup of krameria and distilled water. In the face of a complication which always alarms the patient, no opportunity for accusing the physician of inactivity should be given. As soon as the expectoration has been colorless for three or four days, the patient may be allowed to get up for a few hours.

In the presence of serious hemoptysis, when the blood is issuing in successive jets from the patient's mouth, the physician's presence is the most important factor of all in the treatment. As long as the blood continues to flow he should not leave the bedside. A consumptive with true hemoptysis, especially for the first time, does nothing but senseless things, and the family likewise. The patient tosses about, throws his head around, coughs violently, sits up, lies down again, talks, groans, tries to wipe his mouth, etc.—all highly prejudicial actions. Those about him hold his head, in an entirely inappropriate manner, as a rule; they dash around and talk loudly; the room fills with people, the patient is forced to talk even if he wants to keep quiet, and especially, they continuously disturb him in order to apply or have him take all sorts of sure cures for hemorrhage—a mass of drugs that are not in the least indicated.

The physician, instead, sits at the bedside, remains cool even in the most severe cases, keeps hold of the pulse constantly, holds the receptacle for the patient to expectorate into, gently compels him to sit up and stay perfectly quiet, resting on pillows, talks reassuringly to him in low tones, forbids his answering unless it be in whispers, administers opium, and gives him a few mouthfuls of cold water to drink. Cessation of the hemorrhage is thus awaited, and as a rule this soon occurs..

Then, as soon as the blood is appearing only in separate sputa, more or less clotted, the patient is placed in the half sitting posture, well supported by pillows; his opium pills, ergot mixture, and diet are ordered, and a nurse is left with him to keep any one from entering the room, to attend to any necessary things without talking, to keep the patient himself from talking, to hold the sputum-cup for

him, to give him water and food, and to call the physician if the bleeding recurs.

This is the commonest picture of true hemoptysis, and is also the plan of treatment, largely expectant, which I recommend.

When the hemorrhage, after one or more such attacks, has finally ceased, the patient should be kept under observation and treated as already described during the stage of "cleaning up" in the lung.

Some cases are, however, more trying. The hemoptysic patient has been placed under the best possible conditions, but the flow of blood in jets fails to stop, although already a rather large amount of blood has been evacuated. It is well for the physician in such cases to be on his guard in accepting the estimates of the family as to the amount of blood lost. Members of the family are quite apt to assert that bowlfuls of blood have already been spat up. As a matter of fact a hemorrhage that will fill three or four ordinary sputum-cups, apart from the froth which is always present in large amount, may already be considered a rather copious one. The physician should therefore limit himself to what blood he actually sees in judging of this question. As a matter of fact, sufficient prognostic information is afforded in the patient's appearance and symptoms alone.

At all events, when a hemorrhage has assumed alarming proportions, the physician should not remain inactive. Ice given by the mouth in small pieces is a measure commonly resorted to, but I believe ice more useful in the form of an ice-bag to be applied over the part of the thorax from which the hemorrhage is supposed to be coming. Needless to state, the usual precautions to be taken in applying ice are here likewise in order.

Application of ice over certain areas of the body known to awaken reflex vasoconstrictor effects in distant areas, especially over the genital region, is also recommended.

As an emergency measure, constricting bands at the roots of the extremities should always be thought of.

Finally, ergotin or ergotinin by subcutaneous injection is still being recommended. I must confess I have never obtained any very noteworthy results from its use.

For a number of years, inhalations of amyl nitrite have been much used to arrest the flow of blood from the lungs. This is a first class measure, and the practitioner who may be called to take charge of a case of hemoptysis should never be without a few ampoules of amyl nitrite.

Certain observers have reported that chloroform possesses an equally satisfactory action, but I have not had occasion to confirm this assertion.

One must, indeed, expect to see almost any measure arrest hemoptysis, for the most inert remedies are frequently brought into play at the "psychological" moment when the blood flow is stopping of its own accord. This, of course, is no reason for not availing oneself of the remedies in common use.

In the very severe cases, however, the measure most frequently crowned with success is the nervous impression produced by ipecacuanha ingested in a dose of 2 or 3 grams at intervals of a few minutes.

One should bear in mind that the first few retches may be accompanied by a more copious evacuation of red or already blackish blood, and not become alarmed at this primary effect.

Ipecac has often proved successful in my hands in severe hemoptysis. I particularly remember having resuscitated a patient under the following circumstances: The patient was

a febrile consumptive with frequent hemoptysis. During one of these attacks, the left lung filled with blood. Upon auscultation there was almost complete silence on that side. Cough, which was powerless to expel the fluid, had ceased, and I was face to face with a patient already growing cold, almost pulseless, and moribund.

Two grams of ipecac swallowed in rapid succession in tepid water brought on a violent paroxysm of vomiting within a few minutes. A flood of dark blood was expelled, cough reappeared, heat was applied externally, and the patient recovered.

Since that experience I have had occasion to intervene several times in more or less serious cases of this type, and I do not hesitate, in view of the good results obtained, to recommend this measure, somewhat trying, to be sure, but which has frequently enabled me to master a serious hemorrhage and cut short the asphyxial symptoms.

After a severe hemorrhage, a rather prolonged period of "lung cleansing" is to be expected, sometimes an entire week, not to mention that slight fever from suppuration may likewise appear. Hence the necessity of active supervision on the physician's part and the advisability of keeping the patient at rest for a longer time.

How should the patient be fed during an attack of hemoptysis?

In the presence of the minor degrees of blood-spitting, we have never had any ill results from continuing the ordinary régime. The patients take food in bed in such amounts as satisfy their appetite, abstaining only from hot soups and anything that might introduce into the stomach a large mass of hot material.

In more severe hemoptysis, as long as there is any threat of hemorrhage, the procedure best answering the immediate

needs is absolute starvation for twenty-four hours, during which time the patient takes only a few mouthfuls of cold water at intervals. In the vast majority of cases, hemoptysis is related to high vascular tension, and even in the event of doubt in this connection, it is safer to restrict somewhat the amount of fluid in the system.

After a day or two of starvation, the patient may be given milk or bouillon in moderate quantities, and as soon as the expectoration is solely that which reflects the cleaning up process, he should be put back on his usual diet, in accordance with his appetite. A milk diet kept up for a number of days has the disadvantage of contributing to the induction of constipation, which is already favored by the rest in bed and the opium or the morphine injections.

For the first few days I am in the habit of actually favoring constipation in order to avoid the bodily movements in defecation. Suppositories are regularly ordered, for use at least every evening, in order to facilitate expulsion of the fecal material.

In brief, in the presence of hemoptysis, the physician must keep very cool and be very prudent. He should endeavor to inculcate his feelings of confidence into the patient in order to obtain thorough obedience to his recommendations.

Such is the plan to be followed during the acute emergency.

**Prevention of Recurrent Hemoptysis.**—Where, however, attacks of hemoptysis recur several times a day for several days, measures must, if possible, be taken to prevent these recurrences.

Under these circumstances the physician is given sufficient time to make a selection from among the treatments in highest favor.

While omitting reference to the various general principles of treatment already described, stress should here be laid upon the great importance that may attach to reduction of fluids. In several instances I was able to arrest recurring attacks of hemorrhage by interdicting almost all fluid for twenty-four hours, although all measures previously used had completely failed.

Under these same circumstances, the most highly regarded measures are as follows:

(1) Emetics—ipecac or tartar emetic—in fractional nauseating doses. Quite frequently, in my estimation, these act merely by virtue of the diarrhea, of variable amount, they induce, thus depleting the circulation.

(2) Calcium chloride by the mouth. This measure has been the subject of much discussion, but seems actually to possess some hemostatic action.

(3) Hypodermic injections of gelatin in saline solution. If the preparation used has been well sterilized, this procedure is devoid of danger.

Here again the alleged hemostatic action in hemoptysis is recognized by some and contested by others. The physicians in sanatoria, who enjoy the best opportunities to form an accurate estimate of its value, are fairly well convinced of its beneficial action—and justifiably so, in my estimation. I have had a rather extensive experience with gelatin solution, and do not hesitate to recommend it highly as the most reliable, though not infallible, measure to prevent return of rapidly recurring hemorrhages, with the patient already receiving the benefit of all the customary general prophylactic measures.

(4) Hypodermic injections of emetine, recommended some years ago for hemorrhage in general and hemoptysis in particular. Needless to state, we have used them, in fact

used them a great deal, in the doses held to be active. But in spite of the enthusiasm of certain observers for this drug, to which they owe successes which I do not in the least dispute, I must state that so far I have never seen emetine injections unmistakably arrest the recurrence of a hemoptysis which was beginning to be troublesome, any more than I have seen the same result procured through the use of ergotin. For it is in these terms, indeed, that the proposition must be stated, and it is useless to talk about the action of emetine in an ordinary attack of blood-spitting which stops of its own accord in five or ten minutes.

(5) Continuous application of ice over the tuberculous focus which is supposed to be the source of the blood. This is undoubtedly one of the best measures at our disposal.

(6) In late years, in cases of severe, recurrent hemoptysis, threatening life owing to its repetition, temporary artificial pneumothorax (Dumarest), which checks the flow of blood by exerting pressure on the bleeding portion of the lung, has been employed. This constitutes, in a word, a surgical treatment of hemoptysis by direct compression.

**General Prophylaxis of Hemoptysis.**—While it is a source of satisfaction to feel oneself in possession of suitable weapons for combating hemoptysis, it would be vastly more satisfactory to us, still, to be able to predict the occurrence of this complication and forestall it by taking into account beforehand its causes, which are now fairly well known.

Obviously, it would hardly be possible to prevent the rupture of a vessel through acute suppuration, a pulmonary apoplexy, or the rupture of an aneurysm in a lung cavity. But in a host of other cases, if the tuberculous subjects would take care of themselves systematically, painstakingly,

and in accordance with the physician's directions, how many attacks of hemoptysis would be obviated!

Let us review the facts in this connection.

(1) Hemoptysis as the initial warning of oncoming tuberculosis. In nine instances out of ten, this accident is an initial warning only because the incipient tuberculosis has been overlooked; because the disease skipped certain symptoms which should have brought the patient to the office of the physician, who, in turn, would have made an early, prehemorrhagic diagnosis, and insisted upon suitable preventive hygiene. The blood-spitting, indeed, is due to general overstrain, to exposure to heat or cold, to excessive eating, to undue exercise of the upper extremities, etc. If the tuberculous subject had known that his apexes were diseased, he could have protected himself from these complications by avoiding all the causes just mentioned, capable of causing the outburst of hemorrhage-inducing congestion about the site of tubercle implantation.

(2) Among recognized cases of tuberculosis living at their own discretion, expectorating more or less, sometimes under the physician's supervision and at other times not, hemoptysis appears from the same causes as in the preceding type. It always results from fatigue, excesses of all kinds, exposure to heat and cold, exercise of the arms, etc., as well as mistakes in the diet. It is in this group that the attending physician may best put into practice the preventive hygiene of hemoptysis, for the established case of tuberculosis rarely fails to seek medical advice. He should warn the patient of everything that is capable of inducing hemorrhage, and should also explain to him, upon subjecting him to treatment by rest, fresh air, and diet, that in accordance with his constitution and the condition of his circulation, he has certain definite chances of tolerating

relative overfeeding for a more or less prolonged period of time, or of tolerating it only temporarily, or even not at all, except at the risk of developing a series of disturbances of which, as a rule, alimentary hemoptysis is the first to appear.

By proceeding thus, *i.e.*, by instituting such dietary regulations as appear to correspond with the patient's constitution and the condition of his digestive organs, the physician has it within his power to obviate the majority of attacks of hemoptysis among the tuberculous.

The practitioner must not, however, conceive the idea that he will, with absolute certainty, be able to predict the oncoming of the untoward results of overfeeding. Many patients who, while in a rundown condition, have tolerated perfectly a large amount of food, become intolerant of it as soon as they have partly built up again their undermined system. The physician may then experience more or less unpleasant surprises.

Yet, imminent disturbances of this nature generally give warning of their approaching onset by rather striking manifestations. These comprise a peculiar congestive, somewhat plethoric state of the individual, with a sensation of weight in the stomach, a heavy head after meals, and red areas on the face and ears; there is slight, unaccountable diarrhea rather than constipation; the urine is of high specific gravity; the patient is restless at night; the expectoration, for no known reason, increases in amount in the course of a few days; a small spot of brick-red discoloration or pure blood appears on the first sputa every morning, the expectoration through the day remaining colorless; there are acid eructations three or four hours after meals; finally, the liver may become enlarged. All this constitutes a group of minor symptoms and signs which are not to be neglected;

which, indeed, must be detected, and which enable the physician to act promptly. They are indications of a quantitative or qualitative food overflow, and the treatment required is starvation or a purgative to begin with, and subsequently a change in the diet.

(3) Equally common, if not more so, and of like interest, are the instances of hemoptysis accompanying menstruation. These may always be foretold, if not prevented, for very few tuberculous women have not at some time or other experienced this complication.

Whether menstrual fever does or does not coexist, the manifestations in these cases vary greatly. For a day or two, the sputum may be merely spotted with blood and generally, in everyday life, the patients get accustomed to this appearance of their sputum and pay little further attention to it. Or, there may occur two or three very minor hemorrhages which in no way disturb the usual course of events at the menstrual period. Even under these conditions, the hemorrhages are always the result of an attack of lung congestion at the site of tuberculous involvement.

In other instances, among patients whose menstrual periods are about to cease, the disturbance consists of one or a series of rapidly successive hemorrhages, compensatory or derivative in the sense that the menstrual flow, no longer taking place by the ordinary route, issues through the pulmonary wound, always ready to bleed under the least congestive influence.

Exceptionally, the pulmonary hemorrhage is a severe one, in which case it is likely to terminate spontaneously.

Hemoptysis should be looked for in all patients whose menstruation stops. Very frequently a preliminary warning of it is given in a tendency to epistaxis. Under these circumstances, when the usual time of menstruation is at

hand, and especially if the temperature rises without any known cause, it is well to keep the patient in bed until the excess of temperature above the customary curve has been eliminated, whether the menstrual flow does or does not appear.

Measures calculated to turn the tide of congestion towards its natural outlet are not lacking, and the physician will have merely to apply them in these cases.

Of the so-called emmenagogue drugs in common use, apiol appears to me to have proven the most serviceable under these circumstances.

As for local or neighborhood counterirritation, this is always in order, and I have never found it in any way prejudicial.

Lastly, the patients should be made to realize that irregularity, paucity, or complete suppression of the menstrual function in their cases is only a temporary disturbance which may be accompanied by various discomforts, and that things will right themselves when they regain their strength.

**Secondary Effects of Hemoptysis.**—The influence exerted by hemoptysis on the progress of the tuberculous lesions in the lungs may next be referred to.

In a general way, true hemorrhage or a mere temporary oozing of blood at the focus of tuberculous infection is incapable of causing any serious local results. When the bleeding stops and the usual expectoration has become colorless again, the whole disturbance should be at an end.

Where there has taken place an actual infiltration of blood into the normal or diseased lung tissue about a softened tuberculous focus—a very frequent occurrence—the blood must be removed through a "cleaning out" process, whether it be eliminated with the pus in the

sputum or absorbed through the vascular channels themselves or through the lymphatics. The resultant local damage should not, however, be very marked. This is what takes place in a large number of instances of minor lung apoplexy among consumptives.

The so-called *"phthisis ab hemoptœ"* of Morton, recognized at a time when the bacterial source of tuberculosis was not yet known, might be grouped along with these cases. A few authors still recognize the condition by admitting the possibility that infiltration of the lung with blood may favor development of the tubercle bacilli.

What seems far more actively, however, to govern the *ultimately* mild or serious nature of hemoptysis is its cause in the individual case.

Highly competent observers have recently taken up anew the question of "beneficial" hemoptysis, if it may be thus spoken of: Certain instances of hemoptysis occurring in the earlier stages of tuberculosis in individuals of a somewhat special type of constitution have been considered manifestations of a favorable reaction of the system against the tubercle bacillus invasion. In this group there has been described the so-called "defensive" hemoptysis.

From the fact that certain more or less incipient cases of tuberculosis, seized with copious and even repeated hemorrhages, have subsequently made a splendid recovery, the conclusion seems to have been reached that hemoptysis is not only a useful occurrence, but is also an indication of a favorable ultimate prognosis, the patient showing that he is defending himself well.

Obviously it would be childish to throw overboard this theory, for a demonstration either for or against its validity would be difficult to secure. Here, as usual, pure clinical observation proves of service.

Hemoptysis at the beginning of tuberculosis, due solely to the presence of tubercles in the lung, appears to me to be exceedingly uncommon. It may even be questioned whether, if all incipient cases were recognized and systematically treated from the start, any would ever occur. These hemorrhages seem to me to result always from two factors, *viz.*, first, the presence of the tubercles, and secondly, an adjuvant factor which in nine-tenths of all instances consists of local or general overstrain, faulty hygiene as regards food and drink, excesses of any kind, various external influences, exposure to cold, insolation, traumatism, etc.—all causes which are operative all the more frequently in that in the majority of cases the patient is unaware of his illness before hemorrhage sets in, or, if he has known of it, may have failed to follow all the necessary hygienic precautions.

According to this, hemoptysis is always an accidental or casual occurrence, and spontaneous defensive activity of the organism is in no way concerned in its production. Moreover, even if, after one or two early hemorrhages, a patient thus duly warned should take proper care of himself and make a good recovery, this affords no particular evidence in the matter. For it may be supposed that if, aware of his illness from the start, he had likewise taken proper care of himself from the start, he would in all likelihood have escaped his so-called defensive hemoptysis.

While the occurrence of this variety of blood-spitting seems to me highly questionable, I am, on the other hand, quite ready to admit that some consumptives do derive benefit as a result of hemorrhage from the lung, either as regards the general condition, the local condition, or both of these together. In such cases one may, up to a certain point, speak of a "beneficial" hemorrhage.

Upon deeper study, one finds that there are two circumstances to be taken into account in this connection.

In the first place, after a congestive hemorrhage, whether due to an external factor or to an internal cause as in alimentary and menstrual hemoptysis, the patient may experience a definite sense of improvement, which is readily understood. Indeed, the hemoptysis is then an instance of actual blood-letting which puts an end to the disturbances due to the congestive state of the lung, just as epistaxis is the form of blood-letting which causes violent headaches in certain subjects to disappear, and just as the menstrual flow is the form of blood-letting which brings about disappearance of the abdominal and lumbar pains in the catamenial period. The relationship of cause to effect is here plainly shown.

In the second place, there are very frequent instances of hemoptysis accompanying outbursts of eliminatory suppuration. The necrotic portion of tissue eliminated as a slough may, in becoming detached, lead to a variable degree of blood extravasation.

The result of this necrotic process varies in different cases. If its result has been an extension of the focus of softening and if the signs of a cavity have become more marked, it will naturally be said that the hemoptysis has aggravated the situation, because this hemoptysis has been the most striking clinical manifestation.

But if, as is not uncommon, in a patient disturbed by the fever due to lung necrosis, a benign slough is eliminated with accompanying hemorrhage, and after the latter has ceased a state of general well-being sets in, with a drop in temperature and improvement of the auscultatory signs, it will quite as naturally be said that the hemoptysis had a favorable effect.

These favorable or unfavorable conclusions in the matter are governed merely by the fact that all that takes place is referred to the most striking clinical manifestation, *viz.*, the hemorrhage.

If, on the other hand, the physician has in each instance discovered the true nature of the disturbance, as an eliminatory outburst, he will ascribe the result, good or bad, not to the hemoptysis but to its immediate cause, the expulsion of the slough.

**Ambulatory Treatment of Certain Cases of Hemoptysis.**—Keeping consumptives with hemoptysis at rest in bed has been set up as an almost absolute rule, and probably it is justified in a general way. But is it always justifiable to put to bed and keep in bed for a long period all consumptives who spit blood? This is a question I have been seeking correctly to answer for a long time and which daily experience has enabled me to solve at least partially, to the great benefit of my patients.

There are not uncommonly observed patients with recognized or unrecognized tuberculosis, in all periods of life, who bring up blood often, who even "have blood in their mouths," as the saying is, for weeks or even months, especially in the morning, but who never stay in bed, even when they bring up larger amounts of blood, and who do not seem to be any the worse from it. To this it may, of course, be objected that there occur remarkable exceptions to any rule, and that while these patients may behave thus without any apparent harm, this is not a sufficient reason for allowing others to do likewise. Yet if one seeks to get at the bottom of the matter, one often succeeds in accounting for the undoubted clinical fact above referred to. The explanation is that as a rule these subjects, whether men or women, have some form of circulatory impairment.

Again, I have for years—and I do not believe I am alone in doing so—allowed to remain out of bed and in ordinary though moderate activity patients who expectorate blood at their menstrual periods, except in the event of severely distressing disturbances such as major, febrile lung congestion or intense abdominal pain increased by the standing posture and by walking. Since I have been following this practice I have had only gratifying results from it, and our patients are pleased, comparing the discomforts of their menstrual state when out of bed with those formerly experienced when they remained recumbent.

I have become thoroughly convinced of this fact, and feel justified in recommending the practice followed. In general this is the best procedure available for cutting short ordinary menstrual hemoptysis. The procedure is, of course, based on theory, but this theory is a highly plausible one and is corroborated by a host of clinical observations to which I have frequently referred.

Menstrual hemoptysis, whether premonitory or concomitant, whether appearing after sudden suppression or manifest insufficiency of the menstrual flow, constitutes only a deviation of the flow to a weak point in the system, in this instance the pulmonary lesion, an ever patent "issue." Where menstruation is habitually sufficient in a given patient and at one of the periods expectoration of blood sets in, it may be supposed that the causative dysmenorrhea is due to a disturbance of the general circulation, an actual loss of circulatory equilibrium such as is so common in consumptives; and it seems rather rational to at least try to correct this circulatory disturbance by means of a gentle form of exercise such as that afforded by the standing posture, wherever there is no other serious disturbance absolutely contraindicating it. The successful results obtained

through practical application of this view have already been mentioned.

All this led to the question whether, independently of menstrual hemoptysis, certain other cases of lung hemorrhage in consumptives would not be amenable to the same line of treatment.

At first, among a number of women who had done very well under the standing posture during menstrual hemoptysis, I employed the same treatment in the presence of blood expectoration at times other than the menstrual period. In the majority of instances excellent results were obtained.

Later, emboldened by these observations, I applied the ambulatory treatment in a number of cases of hemoptysis in patients of both sexes, and on numerous occasions had the satisfaction of observing cessation in twenty-four hours of more or less closely successive or overlapping attacks of hemoptysis which had been keeping the patients in bed for weeks, although all our most rational and most rationally applied measures against hemoptysis had yielded only highly doubtful results, if, indeed, any results were obtained at all.

In what cases is this ambulatory treatment indicated? This is naturally the first question that suggests itself. I am unable, in spite of an already lengthy experience with the procedure, to present a mathematical rule which would enable the physician to decide at once that the method is applicable in a given case of hemoptysis. Such a rule may, in all likelihood, be formulated on the basis of future study. For the time being, however, the decision depends rather upon general clinical experience with the procedure; and following are certain facts which may be of assistance in this connection, independently of the menstrual period.

Given a consumptive who expectorates a more or less considerable amount of blood, with or without fever, a variable number of times, at short intervals at first, and later at longer intervals. The fever, primary or secondary to the hemoptysis, has almost or quite subsided; leaving the patient with his normal apyrexia or the 37.5° or 38° C. (99.5° or 100.4° F.) of evening temperature he showed before the onset of the disturbance. The sputum seems to be losing its red color. Recurrence of the hemorrhage takes place without apparent cause, often at night during a sleepless period, or in the morning when the patient awakes at the usual time. Nothing further happens for twenty-four or forty-eight hours, and the sputum becomes colorless again. Then another hemorrhage occurs by night or day, though often after sleep; and so on for a number of days.

Careful examination of the contents of the sputum receptacle quite often reveals one or more bronchial casts, more or less branched, dendritic, still dark red, or already half decolorized. In some instances the product of the recurrent hemoptysis consists of a single mass of blood containing a cast of this kind; at other times, there are several masses of bloody expectoration embodying coral-like branched formations. These various findings I have already described in an earlier publication.

The physician aware of these particular modalities of hemoptysis will often have occasion to observe, if he is not familiar with the fact already, that his patient has heart trouble, that he is conscious of his heart, that he easily develops palpitation from emotional impressions, that he is unquestionably of the nervous type, that his sleep is often either heavy or restless independently of any drug, and that under ordinary circumstances his temperature upon awaking is above normal.

Nothing further is required to suggest that such a patient might require ambulatory treatment. In order not to act too hastily in the matter, especially from the standpoint of the patient's family, the patient may be first advised to move about a little, to turn around in bed, to sit up frequently, in spite of the fact that he has been kept strictly or relatively immobilized for a long period. If, after a moderate amount of motion for twenty-four to thirty-six hours, no unfavorable happening has occurred, the patient is allowed to get up in the room. The expectoration of blood is then very likely to stop permanently.

One should not get the idea that this treatment is to be reserved solely for cases of rather mild hemoptysis, becoming somewhat troublesome merely on account of their long duration. I have applied it in hemorrhages which, in frequency of recurrence, amount of blood lost each time and prolonged duration of the disturbance, had unquestionably assumed a serious aspect. In each instance, when the diagnosis underlying the treatment was correct, the hemorrhage stopped short and the sputum rapidly lost its red color.

I am inclined to believe that the theoretical explanation of these clinical results, which to me are unquestionable, lies in a series of facts which I have already emphasized in several earlier contributions. These facts all seem to me to demonstrate something already generally suspected, *viz.*, that the recumbent position and immobility predispose to congestive disturbances in certain individuals whose circulatory system is not in a state of perfect equilibrium either because of some actual organic disorder or of some functional disorder, as this term is now understood; that sleep in itself is an important influence favoring a general and temporary congestive state, which influence becomes superimposed upon that of recumbency; that some subjects

harboring circulatory defects and at the same time exhibiting a special nervous tendency are apt, from the fact of staying in bed and particularly from sleeping, to develop minor bronchial hemorrhages in the vicinity of their tuberculous lung lesion; that this gradual oozing and flooding with blood of an area of lung connected with a given bronchus often gives rise to the formation of a branched clot corresponding to the bronchus containing it, which clot may be expelled as a foreign body either upon awaking in the morning, a few hours later, or after a longer time; and that this group of phenomena reflects a condition of especial stasis and blood stagnation surrounding the softened tuberculous foci in the lung.

From correlation of all these data, the conclusion I reached was that, in such instances of hemoptysis, allowing the patient liberty of motion would be likely to give better results than prolongation of more or less strict rest in bed—and practical experience has confirmed this view.

Among these fundamental conceptions there is one which very frequently affords confirmatory evidence when the ambulatory treatment is applied to certain cases of hemoptysis, *viz.*, that of the clinostatic and orthostatic temperatures. Thus, suppose we have an ordinary tuberculous subject almost or quite free of fever, and this patient has an attack of hemoptysis which, without being particularly serious, is repeated indefinitely every night or every morning upon awaking, and is associated with a certain amount of congestive moisture about the focus or focuses of lung suppuration, together with a slight excess of temperature both morning and evening. The exact variety of the hemoptysis having been ascertained, the physician decides to let the patient out of bed. The blood promptly disappears from the sputum and already on the next day the tem-

perature falls to 36.4° C. (97.52° F.) in the morning and 37° C. (98.6° F.) in the evening, although while the patient was in bed, it had been 37.2° to 37.4° C. (98.96° to 99.32° F.) in the morning and 38° to 38.3° C. (100.4° to 100.94° F.) in the evening. It may be added that for eight, ten, or fifteen days before the patient was allowed up, all the most rational measures had been applied without preventing the blood from recurring in the sputum. This is an everyday type of case.

While it is rather easy to discern when a continuous, dragging case of hemoptysis warrants the institution of ambulatory treatment, it would seem more difficult to apply the method in a case of hemoptysis at its very outset. This is unquestionably the fact; but what it shows is simply the necessity of recognizing the cause of the hemorrhage likewise at the outset.

From the start it would seem inadvisable to place under ambulatory treatment a consumptive who develops hemoptysis with marked, continuous fever, as in the case of congestive lung attacks with fever, bronchopneumonic or pleuropneumonic attacks, marked lung congestion at the menstrual periods, attacks of intensive eliminatory suppuration, or exacerbations of the tuberculous process. Here, indeed, the congestive or inflammatory condition is primary to the hemorrhagic feature of the disturbance, and in itself governs the treatment. Even so, we have already learned that many of these congestive and febrile hemorrhages warrant ambulatory treatment when, the fever having subsided, they drag on without any apparent reason or logic.

But under many other circumstances, aside from the ordinary cases of menstrual hemoptysis, it will not seem difficult to make a decision as to the expediency of ambulatory treatment from the very onset of the disturbance. This

applies to many instances of hemoptysis of alimentary origin, always foretold by a few spots of blood in the first sputum after awaking in the morning, without elevation of temperature—in the cold, as it were—and leading to an actual hemoptysis, as a rule without much fever, when this warning has gone unheeded; likewise, to a group of cases of lung hemorrhage that may be qualified as "emotive," among patients with some heart defect; and finally, to a host of minor instances of nocturnal blood expectoration without known cause or preceded by an unpleasant dream or nightmare, occasionally by an epileptic seizure, etc.

If, after having used the ambulatory treatment under these various conditions, and witnessed its good results, one seeks a deeper explanation of these things, one will be likely to find that these modalities of hemoptysis among the tuberculous develop upon a special variety of soil, *viz.*, the patient's circulatory defect, more or less supplemented by nervous instability.

### III. Chest Pain in Tuberculous Subjects.

(*a*) While it is generally true that consumptives do not experience pain, it is nonetheless a fact that in many cases they do complain, either intermittently or rather constantly, of pains in the chest.

Some experience for prolonged periods a dull pain or cramp in the shoulder region on the affected side, as a rule posteriorly in the vicinity of the spine of the scapula. True neuralgic points are seldom met with in these cases. The condition is one of spontaneous or induced sensitiveness, rendered worse by movements of the shoulder, and similar to that elicited by percussing or making pressure with the finger over the supra- or infra- clavicular regions on the affected side.

When, in a patient of this type, muscular or other rheumatic pains, which occur in the tuberculous as in any one else, have been carefully excluded; when it has been ascertained that the pain is a lasting one and is not due to a temporary cramp or to faulty posture during sleep, the first aim should be to tranquillize the patient and practice mental treatment, as one cannot very well count on being able to allay the pain at will.

The patient should be convinced that the pain is nothing serious and is not a sign of complication or aggravation of the disease; that these pains are due to the adhesions of the pleura around the pulmonary lesion; that they constitute an immediate accompaniment of the lesion; that he should be patient, while awaiting improvement in the lung condition; and finally, that the pains are not permanent, but come and go, etc.

The same principles apply to the various forms of pain among the tuberculous as to their cough in general. The same plan of training the patients is in order. One patient, experiencing a given intensity of pain, will make loud complaint; another will merely refer to the fact that he has it. It is quite justifiable to contrast the underlying sensitiveness of the two patients. Each one has his own way of responding to suffering. But there is also to be considered the fact that whereas one individual, through early training or being accustomed to sympathy, may constantly be complaining of some form of pain or distress, another, suffering to an equal degree, will complain rarely or not at all, because he has not originally been spoiled by his family.

The consumptive who is ceaselessly moaning is thoroughly unhappy. Fortunately, patients of this type are generally amenable to a special course of training which might be termed "training for pain," *i.e.*, training to dis-

regard pain. The patients are taught not to pay attention to their pains or discomforts, not to cultivate them, and as a matter of fact, actually not to suffer, just as they are taught not to cough unnecessarily.

Institution of this form of training will not, of course, prevent the physician from using the well-known measures applicable in these cases, such as painting with tincture of iodine, soothing applications, counterirritants, and particularly the actual cautery. Sometimes swathing the shoulder in a layer of cotton affords marked relief. At other times the pains may be advantageously antagonized with repeated fly blisters.

Certain other patients complain of pains more distinctly neuralgic, at a variable elevation on the chest. Generally, such pain is felt posteriorly, along the spinal column, and at a more or less dependent point in the axillary line.

At times there is lancinating pain, quite evanescent, coming on spontaneously or as a result of cough, laughter, or heightened respiration, as during locomotion.

In such a case the patient should be reassured if the experience is new to him; otherwise he will often imagine that some form of complication is setting in in his chest. He should be told that these neuralgic points are due occasionally to irritation of the intercostal nerves by pleural adhesions, etc. Meanwhile a careful examination of the chest should be made, his temperature taken, and the fact made certain that no new pathological condition has set in.

Where these neuralgic pains persist for several days, they are often due to minor attacks of dry pleurisy. Upon auscultation a small area of friction will sometimes be found at a point of the pleura where none had been present before.

(*b*) Appearance of this auscultatory sign in conjunction with the least rise in temperature, especially in the morning, demands rest in bed. This is the best way to place the corresponding lung in relative immobility. All motion, indeed, accentuates the pain and cannot but keep up or aggravate its original cause.

In the presence of mild, rather easily bearable pain, mustard applications containing one-third to one-half of mustard flour, or a fly blister, may do good through counterirritation.

In the way of internal medication for neuralgic pains in the side, antipyrin and acetylsalicylic acid succeed most frequently.

I have many times applied dry cups over the painful area, without witnessing much benefit. Wet cups, on the other hand, proved much more efficacious. There is a general tendency to be afraid of withdrawing a little blood from consumptives, but this is unfounded, as will readily appear when one considers how little these patients are physically troubled by light attacks of hemoptysis.

In fairly robust patients suffering from severe costal pain, especially if a trace of dry pleurisy is thought to be at the bottom of it, there should be no hesitation in applying a few wet cups, and the patient will be relieved.

All the preceding therapeutic measures are applicable in cases with more or less severe pain when the physician has special reasons for not giving morphine subcutaneously or where the patient is afraid of such injections—generally because he has never experienced any.

If necessary, hypodermic injections of ether may be tried, but their analgesic action is not certain and cannot be greatly relied upon.

In the more severe cases, in which every movement, inspiration, act of coughing or mere talking brings on pain

sufficient to make the patient groan, morphine injection is the measure which rarely fails to achieve its end.

Nor is local hydrotherapy, according to the Priessnitz procedure, to be despised. The simplest plan is to envelop the painful area with a moist compress. It must be admitted that some patients still object to this procedure, which is nevertheless an excellent one.

(*c*) In all instances the physician should remain carefully on the watch for persistent local pain in the side. For apart from the cases in which, in a nervous subject, the neuropathic state amply suffices to account for a violent and lasting intercostal neuralgia, such pain should always suggest the thought of some new morbid process breaking out in the lung, especially at its surface.

The physician should not conclude that there is nothing wrong from the mere fact that auscultation reveals nothing in particular in an area of localized pain in the axillary line, for example; for pain along the course of a nerve is generally not referred to the point at which the nerve is actually being molested. The least trace of pleural tuberculosis in the costovertebral angle is quite capable of inducing most severe pain in the axillary line.

(*d*) Stress has been repeatedly laid herein upon the diagnostic value of pain elicited by pressure of the finger at certain points of the chest in consumptives. At the very beginning of the disease, when the other constitutional and even the local signs leave the physician in doubt, two signs should turn the scale toward a decision in the affirmative sense, *viz.*, first, small lymphatic enlargements in the supraclavicular fossa, and secondly, localized apical pain induced by pressure with the finger.

It is exceedingly rare for a tuberculous subject not to complain of pain when pressure is made with the finger tip

over the point of the chest corresponding to his *active* lesion.

This sign, diagnostically so valuable, may, however, in a few rare instances, lead the examiner to suppose that a tuberculous lesion is still in an active state when, as a matter of fact, it has given no signs of activity for several months and is completely dried up, and no trace of it can be found upon auscultation, even after deep cough.

I have recorded a series of cases of this type. They are always nervous, sensitive subjects; even after recovery appears to have been well established for several months, the spontaneous neuralgic pain may persist at the points of the chest where it had been previously situated during the active stage of the pulmonary disease; in these cases one is able, as before, and for a prolonged period, to provoke the pain by pressure with the finger over the extinguished bacillary focus. A fact which appears to me to prove that such an interpretation is not erroneous is that in young girls or women showing this particular condition, several menstrual periods may elapse without any signs of recurring activity in the healed tuberculous focus and without the least temperature on these occasions, whereas a few months before, such local and general reactions had never been wanting.

In the male subject I have less often witnessed this unusual persistence of the spontaneous and induced thoracic pains.

I am in the habit of calling these pains the *posthumous* chest pains in tuberculosis.

To be sure, they do not persist indefinitely. In my experience they have always passed off after six or eight months. This need not occasion particular surprise. Originally pains of organic source, they gradually become

pains due to habit or recollection on the part of the tissues, and after a certain period, as the obsession of the original disease passes off, they likewise gradually disappear.

Reassuring words to the patient and an attempt to convince him that the "posthumous" pains no longer represent any actual tissue disturbance undoubtedly constitute the best plan of treatment.

(*e*) No detailed reference need here be made to the severe pains in the side accompanying perforation of the lung and pneumothorax. The physician should always bear these perforations in mind, especially those causing partial pneumothorax in the midst of pleural adhesions. These conditions, however, belong among the actual complications of pulmonary tuberculosis and have no special relationship to the hygienic treatment.

(*f*) *Interlobar localized pain* is distinguished by the fact that the painful areas do not follow the course of the intercostal nerves, but are localized, at least apparently, over certain portions of the borders of the pleural spaces separating the lobes of the lungs. These pains are chiefly of academic interest.

There is one type of pain, however, located in the vicinity of the spinal column, which is of marked significance to the patients themselves. I have termed it the paradoxical pain.

(*g*) *Paradoxical Pain.*—This is a fairly common clinical occurrence. By reason of its peculiar characteristics it is capable, on account of the customary mental condition of consumptives, of placing the physician in an unfavorable light, suggesting that the results of his original examination of the patient, as described by him, were wrong, and that his examination was improperly carried out. What assertions the patient may be led to make on the matter

may appear to him to be entirely justified, being based on the presence of a definite, fixed local pain.

Thus, a patient presents in his apexes mild, well circumscribed lesions, and in addition, a secondary pleuropneumonic focus in the posterior portion of the upper lobe of the left lung, in the vicinity of the interlobar fissure and the spinal column. These processes are strictly localized, the remainder of the lungs appearing, even upon repeated auscultation, to be relatively free of any focus of bacillary disease.

Apart from the apical lesions, pressure with the finger readily elicits distinct and well localized pain at the site of the second or juxtavertebral lesion. In addition, there are noted, a variable vesicular murmur, crackling sounds, râles indicating the presence of a cavity, pectoriloquy, etc. Dulness and fremitus are here not always of much diagnostic value, as the disease focus is commonly not far from the mediastinum and pulmonary hilum.

On the right side, at a point directly opposite, nothing is found, save temporarily, perhaps, in patients subjected to overstrain, sounds transmitted through the spinal column from the opposite side, which sounds are not likely to mislead the examiner very long.

Under these conditions the patient, taking good care of himself and often already showing marked improvement of his apical lesions as well as of the juxtavertebral diseased area, without any known cause, without an error of hygiene, and generally without any rise in temperature, suddenly experiences, on the right side, at the opposite point on the spinal border, a spontaneous pain, which pressure with the finger renders still more definite. Percussion as well as auscultation over this area prove negative. Nothing else happens, as a rule, during the entire time this

pain lasts, *viz.*, from a few days to a week, or even longer. When the pain disappears, the condition remains in no wise different from what it had been before the pain came on.

The above represents the ordinary course of events. But it sometimes happens that the pleuropneumonic focus, above or below the interlobar fissure, has not made its presence known to the patient by causing local pain, and the patient is unaware of its exact position except as it is shown by the tenderness elicited on pressure by the physician's finger. If the physician has not already informed the patient of the existence of the focus on that side, the patient is not at all unlikely, on some future occasion, to experience the paradoxical pain on the right or the left, without being aware of the fact that he has a tuberculous focus at the opposite point on the left or the right.

Finally, it may be that a small juxtavertebral lesion of this kind will have been entirely overlooked by the physician, occupied as he was in examining the more extensive lesions in the apexes; and he will then be rather nonplussed to find that the side of which the patient complains does not correspond to any apparent lesion, whereas on the other side of the spinal column a tuberculous area exists. The condition plainly deserves the application "paradoxical."

This paradoxical pain may last but a short time, *e.g.*, two or three days. It is very apt to recur sometimes after long intervals. It may be nearly continuous even in the presence of a juxtavertebral focus almost unknown to the patient.

It often appears without any apparent cause. If overexertion, undue motion, or exposure to cold has recently been operative, the patient will seek to account for it in this way, though doubtless this apparent causal relationship is very frequently but a coincidence.

In some instances, however, the etiological relationship seems very clear. In patients harboring a juxtavertebral area of disease already in a softened condition, an attack of eliminatory suppuration may be accompanied by localized pain directly on the opposite side; in other instances, this pain may appear in conjunction with a hemorrhage originating on the side of the actual lesion; finally, I have seen women who, at several of their menstrual periods, had sharp pain on the side opposite a juxtavertebral lesion.

This clinical phenomenon is of interest and significance because, in the first place, it may lead to a mistake in the formulation of an exact diagnosis, and secondly, it may give the patient an unfavorable impression of the physician. The patient, indeed, has every reason for supposing that the physician made a serious error in telling him he had, to the left or right of the spinal column, a pleuropulmonary focus of which he (the patient) has little or no subjective knowledge, though definitely aware that he has pain on the opposite side.

The physician, then, must be sure of his original diagnosis; and when the patient, some day, describes a paradoxical pain, should not let himself be taken in and conclude at once that a focus of disease has set in on the side previously supposed to be normal.

Only one new clinical manifestation appears in connection with this paradoxical symptom: Pain, both spontaneous and elicited by finger pressure. All else is negative. The physician, then, after brief investigation of the matter, should definitely assert that no new lesion has set in.

This is not sufficient, however. To allay the patient's fears, he must also be offered an explanation of this paradoxical pain which seemingly corresponds to no area of diseased tissue. What sort of an explanation can be made?

To say merely that it is a reflex neuralgia from the lesion on the opposite side is not much of an explanation; it is not clear why any lesion in a lung might not induce symmetrical neuralgia in the opposite organ. The pathogenesis seems readily cleared up, however, if one recalls that the paradoxical pain is exclusively situated in the parts directly opposite to tuberculous foci in the lung tissues surrounding the hilum. Characteristic of this hilar region is the presence of series of lymph-nodes which, in consumptives, are often involved, enlarged, and undergo acute attacks of congestion or inflammation in accordance with conditions prevailing in the neighboring tissues with which they are connected through the blood circulation.

Does it not seem permissible to conclude that, in themselves, these diseased lymph-nodes may give rise to a local pain, not only felt by the patient but also capable of being induced with the finger? Such a conclusion is in harmony with the two following clinical facts:

(1) In the absence of any juxtavertebral disease focus, in a recognized or merely suspected case of tuberculosis, a temporary pain near the spinal column, more or less paroxysmal or permanent, may be caused by lymph-nodes surrounding the hilum, as is easily demonstrable with the x-rays.

(2) In the presence of a juxtavertebral focus, there may appear, recur, and persist a paradoxical pain which the x-rays permit of correlating with a diseased mass of lymphatics about the hilum.

I am quite ready to accept this view of the pathogenesis, as it is a satisfying one. Further, since diseased lymph-nodes are capable by themselves of bringing on localized pain, there is nothing to prevent any acute secondary lymphatic involvement in this region, whatever be its source

among the neighboring structures, from inducing corresponding attacks of pain.

This would explain how, either in the presence or absence of a juxtavertebral lesion, menstrual congestion, by involving the already diseased lymph-glands at the hilum, may give rise to a corresponding pain, which may or may not be paradoxical according to circumstances. Aside from recognized tuberculous patients, how many young girls and women owe to their peribronchial lymph-nodes so-called dorsal neuralgia, with or without more or less extensive radiation along the interlobar fissures!

### IV. Eliminatory Suppuration.

Tuberculous subjects are exposed, like everyone else, to acute febrile disturbances the result of intercurrent conditions independent of the lungs and unrelated to pulmonary tuberculosis.

They may likewise often present actual pulmonary or pleural complications, bronchopneumonia more or less dependent on the tuberculous infection, pleurisy with serous or purulent effusion, etc.

It should be noted, however, that these complications, always serious affairs, are met with chiefly among consumptives living at liberty. For while it is true that in tuberculosis, with its many surprises and insidious character, even a most carefully treated patient may develop one of these disturbances for no known reason, it is none the less true that these difficulties appear, as a rule, after indiscretions of hygiene.

The proof of this is that in sanatoriums, among the consumptives I have termed the "normal" applicants for treatment, whether they be completely afebrile or sub-

febrile or frankly febrile in the evening, such complications are rather rare.

Yet, among patients undergoing the hygienic treatment, one does witness febrile attacks of variable duration, after which they usually return to their original condition of more or less complete apyrexia.

It is not always easy to say what the cause of these febrile disturbances is in the individual case.

In some instances the condition is simply an actual "cold." The consumptive has caught cold, experiences malaise, slight coryza, and sometimes sore throat, and then, according to a commonly used phrase, the cold drops down to the bronchi. Sometimes the condition is confined to a tracheobronchitis; in other instances it extends to the pulmonary lesion itself.

Upon auscultation one notes more or less sibilant and coarse râles in the chest, and as a general rule the tuberculous focus yields signs of unusual moisture. Expectoration is more marked, and cough more frequent. The fever, often slight, may nevertheless be rather pronounced, especially in the evening, for thirty-six to forty-eight hours. In brief, there is witnessed a more or less serious attack of bronchitis. The temperature then recedes rapidly to the vicinity of the customary "normal" temperature, expectoration remains rather abundant for a few days, and the patient shows slight loss of weight owing to the fever and reduction of diet. Convalescence is rapid, and when the appetite returns the ground lost is quickly made up. As a general rule, these colds leave no residual trace perceptible upon auscultation; it may happen, however, that the tuberculous process, always ready to advance when an occasion is presented, takes advantage of the circumstances to extend in some direction or other from the primary focus. In this

event, a slight complication may be said to have set in, the disturbance lasts somewhat longer, and when it terminates, it leaves behind either a small area of fresh râles or a small patch of pleural friction.

All of this is relatively harmless, on the whole, and constitutes merely a slight factor of delay, which postpones recovery.

What occurs as the result of an ordinary cold takes place even more frequently under the influence of grip, now endemic—apart from the periodic widespread epidemics or pandemics—which constitutes a veritable sword of Damocles to the tuberculous. This intercurrent disorder has the unfortunate tendency of leaving trouble behind it. If it is of a mild variety in relation to the lungs, a simple bronchitis alone results; but when it is more severe, it induces fresh tuberculous exacerbations and may also, perhaps, lead to the production of non-tuberculous bronchopneumonic areas. Lastly, it leads to softening and suppurative disintegration of the pre-existing disease areas.

Of the preceding cases, clear cut as to origin and course, no further discussion is required. The consumptive simply caught cold or contracted the grip.

Similar disturbances, slight attacks of lung congestion, attacks of dry pleurisy, small patches of pleuropneumonia, or simply a return of moisture in already dried up pleural patches, may occur from a cause which cannot be too often spoken of and the importance of which cannot be too often emphasized, *viz.*, the action of the sun's direct rays. Disturbances of this kind are unfortunately only too frequently met with among patients who, believing they are doing something healthful, go and sit in the sun.

There may also be witnessed, among consumptives on open air treatment and almost or quite free of fever, febrile

disturbances more difficult to explain. The usual picture in these cases is as follows:

A patient harboring a well marked lesion, as a rule, either completely afebrile or merely subfebrile in the evening, carrying out his systematic treatment in the most exemplary manner, and who has been exposed neither to fatigue nor to cold, is suddenly seized, at any hour of the day, with malaise and chilliness or an actual chill; there is no pain in the side and no dyspnea. Taking his temperature, which was 36.5° to 36.8° C. (97.7° to 98.24° F.) in the morning, he now finds it to be 38.5°, 39.5°, and even 40° C. (101.3°, 103.1°, or 104° F.). Generally he is not coughing any more than usual.

Next morning the temperature descends to about 37.5° C. (99.5° F.), though frequently remaining at 38° or 38.2° C. (100.4° or 100.76° F.). The cough may now show increased frequency, and there may be slight dyspnea, but very often the patient does not complain of it himself, and it is discovered only upon inquiry and examination. Sometimes, too, the side of the diseased apex is a little more sensitive, as though from muscular fatigue.

In the afternoon, the temperature goes up again in the absence of any new sign; sleep, however, is hardly any more disturbed than usual. On the second or the third day, the amount of expectoration increases. This increase of expectoration is the main feature, but in addition, it often presents certain special characteristics. The color of the sputum is often that of actual pus; or, it becomes darker and "dirty"; there may be in admixture with it, especially in the morning, some blood-coloring matter, with a resulting more or less marked brick-red aspect; in the morning, again, more or less pure blood, roseate or blackish, may be found in it. Finally, one sometimes discovers in the sputum

receptacle more solid masses, felt by the patient in their passage through the mouth, and at times also various concretions of cheesy, chalky, or limey consistency. All physicians, moreover, have seen consumptives bring up branched calcareous concretions.

Several patients in my experience, subject to these clearing out attacks, made a collection of the small calcareous concretions brought up regularly at each one of their attacks.

I shall not speak of the several varieties of taste impressions which different patients gain from their sputa and describe. I have known of several who were able infallibly to gauge the nature of their attacks by simply noting the special nut-like taste their expectoration assumed under certain conditions.

The disturbance above referred to lasts for a few days, seldom more than eight or ten, often less, during which fever and expectoration remain the same, in the absence of all suffering and without any special disturbance of sleep.

Finally the temperature drops, either in the morning or evening, and in twenty-four to thirty-six hours it will have returned to normal, at least in the morning, though the evening temperature may drag on a little longer. The storm having ended, the expectoration resumes its customary amount and characteristics.

If, during this short illness, auscultation of the patient is regularly practised, in most instances nothing new will be elicited outside the known limits of the pre-existing lesion. Signs of unusual moisture in this focus and the increased number of râles in the whole or a part of it alone give evidence of anything unusual taking place in the lung.

In these acute attacks, once the constitutional disturbances have disappeared, one very often can find no sign that

any change has occurred in the lesion; it may be noted, however, that at one point there remains a larger area of râles, or that an already known focus of softening has perceptibly increased in size.

What explanation is to be offered of the majority of these cases, *viz.,* those presenting the most clear-cut features?

Congestion of the lungs, bronchopneumonia, etc., are commonly described as frequent disturbances in pulmonary tuberculosis; lumped with these also are the acute exacerbations of tuberculosis.

May one include in this group, an ill-defined group as it is, an acute disturbance which, as it runs its course, generally causes no change in any tissues outside of the preexisting tuberculous focus, and which seldom leaves behind any perceptible traces in this focus itself? Can such be termed an attack of lung congestion? Can it be described as a cold, or an acute exacerbation of tuberculosis, or a bronchopneumonia? Manifestly, no.

These attacks appear suddenly with one or more chills, without prodromes, and independently of any known external factor. The expectoration often presents special features; it is like pus from a suppurating wound—not to mention the special formed materials many times found in it. Finally, in some patients these attacks may recur at intervals, always with similar features, their duration varying only by one or two days, and always with a return to normal between the attacks; the consumptive who has experienced them a couple of times will always recognize subsequent attacks as they appear.

In my estimation, these febrile disturbances occurring in consumptives almost or quite free of fever are due to a

process of elimination of necrotic tissues from the midst of lung foci.

They should not be called acute exacerbations, because this term tends to imply acute tuberculous exacerbations. Now, in all likelihood the tubercle bacillus is not at all concerned in the production of these disturbances.

The progress of the tuberculous process in the lung is a result of the combined action of different bacteria. The tubercle bacillus is probably the germ which does the harm at the start, but it soon has a host of accomplices. Either acting alone or with the assistance of the latter, it brings about the complex lesions of pulmonary tuberculosis, among which partial necrotic processes are legion.

Now, in tuberculosis running a rapid course, or a slower course with successive exacerbations which nothing arrests, these necrotic tissues are gotten rid of in a continuous or intermittent manner, and the process which results in their elimination loses its identity in the general symptom-complex. At each febrile exacerbation, softening of foci and formation of cavities are observed, and that is all.

But in the slow, more or less afebrile cases of phthisis, matters are entirely different.

Often these necrotic tissues undergo elimination through a process of local suppuration. What occurs is that which takes place in all instances where a part wishes to get rid of gangrenous tissue. A process of suppuration sets in about the dead mass.

Is this process carried on by the tubercle bacillus? Very probably not. It is related to other germs always present in the tuberculous foci and which, at the necessary moment, get into action in order to clear out the dead mass. Their appearance upon the scene, which marks the beginning of the local phenomena of eliminatory suppuration, is

shown quite naturally by the usual constitutional symptoms resulting from pus formation at some point in the organism.

It is in this manner that I account for the characteristic symptomatology of the febrile attacks just referred to; and hence, I find it convenient to term them attacks of "eliminatory suppuration," or more simply, "clearing out fever."

Let it not be imagined that, in referring to the above condition, I claim to be describing something entirely new.

The acute exacerbations which result in softening and purulent disintegration of tuberculous foci and cavity formation are well known. But, as we have already seen, they are recognized mainly in the cases of rapidly advancing tuberculosis or when occurring as consequences of febrile disturbances or various complications among patients who have not been willing or able to submit to strict hygienic measures.

What I have sought to show is that in the cases of tuberculosis which should recover, and often even in the mildest cases, one should expect to witness the occurrence of febrile disturbances dependent directly upon the ordinary, regular progress of the tuberculous lesion. The cause of these disturbances is the process of suppuration which is to result in elimination of the necrotic portions of lung tissue; these masses, instead of becoming walled off through deposition of fibrous tissue, behave as foreign bodies, to be cast out from the surrounding parenchyma and replaced by fibrous tissue.

It should not be overlooked, indeed, that while elimination of a large mass of necrotic lung tissue by suppuration may often be considered an aggravation of the local condition—even though, frequently, cavity formation might be

looked upon as a curative procedure—the mild eliminatory attacks just described in tuberculosis without fever constitute an essential factor in the process of repair of the lung tissues.

This is shown by the fact that some patients, definitely grouped among the curable cases or regarded as doubtful risks, really begin to do very well only after they have been through a few attacks of this eliminatory fever.

The treatment of these attacks is very simple. When the first symptom appears I merely put the patient to bed and have him continue his fresh air cure there, with the windows open both day and night, however pronounced the constitutional manifestations may be. Special attention to some symptoms requiring individual treatment is rarely necessary. Rest and opium are the two sedatives for functional symptoms. As for the fever, quinine was found to lower it slightly and antipyrin and its allies to subdue it completely for a few hours. But if, by virtue of the continued fresh air treatment, the patient remains relatively undisturbed by the fever, and if he sleeps enough at night, as is usually the case, no drugs are given.

In brief, treatment is generally confined to immobilizing the patient, relieving his cough, and sustaining him as effectually as possible during the suppurative process he must carry on.

During attacks of eliminatory suppuration the physician should seek to reassure the patient and his family. It is well to explain to them in detail the cause of the disturbance. Consumptives and their relatives always show a tendency to conclude that all is lost when the least untoward complications appear.

## V. Colds in Tuberculosis.

What kind of a disturbance may be termed a "cold" among tuberculous subjects? It must, to be sure, be a "chest cold," for coryza in these patients may be precisely the same condition here as in any one else, provided it does not extend beyond the upper respiratory passages. Does a cold present any special features when occurring in a consumptive? These are the questions I shall attempt to answer in this section, along broad lines only, for the subject is an extensive one.

Consumptives are in no way at a loss when asked to report any cold they may acquire, and will usually assert they have a cold whenever any disturbance apart from what they recognize as their customary tuberculous disease makes its appearance. To them, every disturbance is a cold, for the simple reason that their earlier experience has led them to ascribe to an external cause any form of illness that may present itself. Their fortunate condition of euphoria keeps them from supposing that the reason for such disturbances lies within themselves. Their families are naturally even more inclined than they to speak of a cold as soon as any disturbance sets in. Lastly, it should be stated that in current medical parlance, the word "cold" is purposely applied to many conditions which are not colds in order to avoid unnecessary alarm on the part of the patients and families.

To avoid confusion, it is well, to my mind, to remain within the old lay, as well as medical, definition of the term, *viz.*, that a cold is a catarrhal disorder of the respiratory passages due to exposure to cold. This applies to consumptives as well as to other persons, and the remaining task will consist only in explaining the influence of exposure as a factor in bringing on the cold.

The above definition at once excludes a host of bronchitic and pulmonary disorders which are common occurrences among the tuberculous and which must be distinguished from the true cold. The "false" colds are, as we shall now see, of numerous kinds.

**False Colds in the Tuberculous.**—False colds might be classed in various groups according to whether they are related directly to the progress of the disease itself, to a permanent or temporary dyscrasia of the blood, to manifest external influences, etc. But very often several causes are co-operative, thus rendering clear-cut classification a difficult matter. I shall, therefore, merely enumerate these causes, though trying at the same time to group them as much as possible in accordance with their actual, or at least apparent, relationship to one another.

*A.* For the sake of completeness a few words should be said concerning the false cold which marks the onset of pulmonary tuberculosis. In nine instances out of ten, this is manifested in a dry cough persisting for weeks and months; during this period of weeks and months the patient and his family refer to it at first as an ordinary cold, then a prolonged cold, and finally, a neglected cold. The physician then takes notice of the fact that there are suspicious physical signs at one apex or that there is already a slight bronchitis at some definite point. This slight bronchitis is actually the beginning of tuberculosis, whether recovery from it takes place spontaneously or under appropriate treatment, or it drags on until later disturbances appear.

This variety of false cold is the most important to detect, for upon its early discovery often hinges the question of subsequent life or death of the individual patient.

*B.* There are also exceedingly frequent false colds which merely represent the minor congestive attacks in the

apexes, already discussed. The causes of these vary in different cases, such causes comprising physical or mental overstrain whether in adults or children, insolation or heat stroke, dietary indiscretions, the menstrual period, grip, etc. This congestion or bronchitis in the tissues about the tuberculous focus may last a more or less prolonged period, though usually it is soon relieved, the physician being at hand to order rest and other indicated measures. Needless to state, if the congestion results in hemorrhage, the retrospective diagnosis of tuberculosis is patent to all, unless it be desired at all costs to label the disturbance an arthritic manifestation, either on the basis of a family predisposition of this nature, on the ground that the patient has previously had some joint pains, or especially, that when the congestion has subsided, there is nothing much wrong left in the apexes, even though the same disturbance may have recurred once or twice, always in the same mild form.

*C.* Perituberculous congestion of influenzal origin plays a most significant rôle under these circumstances. While the profession considers it definitely established that influenza is one of the sinister factors inducing activity in a previously latent tuberculous focus, congestive perituberculous attacks of the kind referred to are daily being dubbed attacks of grip, here again because after the attack the apexes show little evidence of disease. During epidemics of grip, the latter disorder lends itself readily to this form of substitution.

Allowance being thus made for mistaken diagnoses, it remains none the less true that often influenza is the cause of these congestive disturbances, with or without hemorrhage, among the tuberculous. But whereas among previously healthy subjects it induces an ordinary form of diffuse or disseminated bronchitis—apart from the bron-

chopneumonia and pneumonia of severe cases—in the tuberculous it gives rise to a localized bronchitis, limited to the tuberculous lesions. Any localized bronchitis at the apex should excite a suspicion of tuberculosis, more or less latent; indeed the conception of a simple grip in these cases should be countenanced only where, after recovery from the grip, a repeated and most detailed, intelligent examination has failed to reveal anything really wrong with the apexes. In brief, then, the influenzal cold in these upper portions of the lungs should always be considered suspicious.

*D.* The minor, periodic colds of the menstrual periods are of no less interest. Some women and young girls nearly every month develop slight hoarseness, with some dry cough and a few minor râles in the chest, not to mention pain in one shoulder or in the side. Naturally one may grant that in certain persons all this is purely neuropathic, for anything may happen. Where these manifestations occur repeatedly, however, the physician should be on his guard. The thermometer should be used, the cough watched, and, especially during the menstrual flow, auscultation of the apexes carried out. The supraclavicular shot-like lymph-nodes should be sought, and the physician should strive to detect the minor râle, whistling sound, or friction rub in the acromial region showing that beneath it there is present a minute patch of dry pleurisy and a few diseased lung alveoli—this lesion ordinarily yielding no signs, but becoming moist at each menstrual period. This apparently insignificant little bronchitis at the apexes almost or quite clinches the diagnosis of tuberculosis.

Patients with established tuberculosis who have ceased menstruating for a time or permanently often imagine they have a cold when the disturbance actually present is the perituberculous congestion which accompanies the milder

form of menstrual fever. For six or eight days, at the time of expected menstruation, cough and expectoration increase, these constituting the main symptoms of the aberrant febrile congestive state, which then disappears as it came, without a trace of menstruation or merely a slight epistaxis.

*E.* The mild acute attacks related to elimination of necrotic lung material are very frequent occurrences in the course of tuberculosis. Excess of fever for a few days and purulent expectoration in increased amount are enough to lead the patient to believe he has a cold, trying, as he always does, to place the blame on some outside factor such as exposure until the physician finally gives him to understand that the reason for the disturbance lies directly in the progress of his own pulmonary lesions.

*F.* Less frequently, bacillary bronchial embolism secondary to a small pneumonic focus undergoing necrosis is mistaken for a cold. On the other hand, this accident is very often ascribed to an attack of grip.

*G.* Among tuberculous subjects predisposed to it—if, indeed, such predisposition occurs—hay fever seldom remains localized in the upper respiratory passages. A bronchitis usually sets in. This bronchitis has, in my experience, always been localized about the tuberculous disease, whether it was a simple catarrhal process or of a spasmodic type, appearing as a "local asthma." Hay fever is always more serious among consumptives than among otherwise healthy subjects; oftentimes it leads to return of activity in a pulmonary lesion undergoing repair, and is frequently accompanied by prolonged fever. As a rule, uncertainty as to the diagnosis in this type of false cold does not continue very long.

*H.* Likewise in predisposed consumptives, traumatic asthma of nasal origin is sometimes seen. Following cauterization of the nasal mucous membrane or partial resection of one of the turbinates, the local reaction, which at times is of rather long duration, is accompanied by pronounced asthmatic dyspnea. This is again a local asthma limited to the diseased portions of the lungs, as is proven by auscultation. The condition is easily differentiated from an ordinary cold, at least after two or three dyspneic attacks have occurred.

*I.* In true cardiac consumptives, *i.e.*, patients with myocardial inadequacy, there occur disturbances which are often mistaken for colds. Bilateral congestion at the bases of the lungs and pleuræ, a condition forming part of the clinical picture of cardiac impairment *per se*, is, of course, not under consideration here. Many consumptives with heart impairment, however, while free of manifest circulatory difficulty under ordinary circumstances, are exposed to attacks of congestion of the lungs when subjected to overstrain. All consumptives, to be sure, develop acute disturbances from overstrain, but in these patients with heart impairment the resulting condition, on account of the two unfavorable factors operative at once, presents special and often dangerous features.

In the milder cases, the clinical condition is a bronchitis with more or less fever, but localized in the vicinity of the tuberculous lesions, and the duration of which is generally directly dependent upon the treatment applied. If the patient is placed absolutely at rest and on a rational diet, the disturbance remains practically limited to an ordinary cold; in the opposite event the cold drags on, though ultimately it yields, mainly on account of the relative degree of rest which the patient naturally feels compelled to take.

In the severe cases, the condition is a febrile congestive attack with expectoration of blood-streaked or purulent and hemorrhagic sputum. It is always a perituberculous, local, pulmonary congestion, involving one apex but slightly, but the other very markedly, and sometimes involving almost the whole of one of the upper lobes. Death may occur unless energetic treatment is instituted at once.

These conditions form part of the group to which I have applied the term *phthisicardiac disturbances*. They occur more frequently in women than in men, and often recur, owing to repeated operation of the same underlying cause, *viz.*, overstrain.

*J.* This same factor, overstrain, which, as we have already seen, is capable of inducing false colds at the very outset of tuberculosis, also brings on in all ambulant consumptives attacks of perituberculous congestion which the patients regularly speak of as colds. Stress has already been laid repeatedly on this fact.

*K.* Some consumptives, generally of the asthmatic type, are seized, when they leave lower altitudes to undergo treatment in the mountains, with a dyspneic state which is merely an expression of climatic asthma. Associated with the dyspnea is a localized, perituberculous bronchitis; the condition is a localized form of asthma, and not a cold as the patients often believe.

Among other subjects, likewise of asthmatic type but already acclimated in the mountains, one sometimes meets with slight attacks of asthma solely as the result of atmospheric changes, thunder storms, heavy rains, and high wind. This again is a most definite, localized, perituberculous asthma, which should not be mistaken for a cold.

This condition of local asthma also obtains in the group of false colds next to be mentioned.

*L.* A host of non-tuberculous people, unquestionably of peculiar constitutional make-up, are extremely sensitive to toxic influences. Excess of food, permanently or temporarily, causes in these "arthritics," as they are still sometimes called, migraine, skin eruptions, epistaxis, bleeding hemorrhoids, and asthma. Certain foods or drugs induce similar effects. When these subjects contract tuberculosis, this sensitiveness to poisons is doubled or enhanced even tenfold, and they become like sensitive plants in their reaction to all endogenous and exogenous intoxications.

Under these conditions, however, the result of the intoxication is entirely changed. Instead of developing nervous, cutaneous, and other disturbances, they utilize their pulmonary lesion as an outlet for toxic material. Hence the conception of tuberculous "issues" in the lung—a conception pregnant with clinical and therapeutic indications, and which has already been discussed in a previous chapter. The pulmonary lesion being the weak point in the body of these patients and constituting a constant means of exit for material to be excreted, an attempt is made to eliminate all toxic fluids at this point. From this circumstance arise attacks of undue moisture in tuberculous foci, with simple or hemorrhagic congestion, always localized. When simple, the condition is readily mistaken for a cold if it is evanescent, while if it is more or less permanent, bronchitis is the term applied.

Let us deal first with the latter, less numerous variety, as it occurs in certain obese subjects, diabetics, albuminurics, and alcoholics.

*M.* Obese consumptives belong to one of two groups:

(*a*) Some are primarily obese, and become tuberculous because, according to a lay expression, their fat is not of good quality. Whether they have inherited obesity and

contracted tuberculosis already in adolescence, or have become obese from high living and contracted tuberculosis at a later period in life, they may experience all the discomforts of the diabetic, though without sugar in the urine. But as soon as the tubercle bacillus has become implanted in their apexes, sometimes for no reason other than their "unhealthy" obesity, they often find their miscellaneous discomforts passing off; their cutaneous and other artificial outlets are now replaced by their pulmonary "issue." They are seized with permanent bronchitis of the upper lobes, of a localized, perituberculous type, and more or less marked according to the condition of their body fluids and the hygienic measures they are following. As this form of bronchitis with copious mucopurulent sputum is capable of fairly well concealing the tuberculous foci, they are naturally led to believe that they are suffering from a protracted, obstinate cold, which refuses to get well, no matter what measures they try.

(*b*) The remainder are secondarily obese subjects. Having contracted tuberculosis for some reason or other, they have taken such good care of themselves, practised complete rest, and fed themselves so excessively, being veritable monomaniacs on the subject of hyperalimentation, that they have passed beyond the level of nutrition required for their recovery. They have become obese, are several or many kilograms above the average weight, and their lung lesion, instead of definitely healing, becomes transformed into an "issue." Being always in a state of nutritive oversaturation, they eliminate their excess at this point, and if the condition is not remedied, no reason exists why the pulmonary lesion should become dry at all, in spite of the patient's appearance of robust health. The condition may persist for years, without causing aggrava-

tion of the disease focus; but meanwhile the patient suffers from a variety of discomforts and disturbances. These cases, which are not very uncommon, suffer, in brief, from a chronic, localized, perituberculous bronchitis.

*N.* In diabetics, the story is about the same. The patients concerned are the heavy diabetics, accustomed to high living, with some alcoholism, not to mention an inherited predisposition. They contract apical tuberculosis, and at once localized bronchitis sets in around their lesions. This bronchitis varies in severity according to the hygienic measures practised, and is of the mucopurulent type, persisting as long as their organic functions remained handicapped by their mode of living. Quite often it is this rebellious cold which, after all of our treatments for it have failed, leads to the discovery of the tuberculosis and glycosuria.

*O.* Not a few albuminuric patients are in a similar condition. The albuminuria is often as yet unrecognized, tuberculosis invades the apexes, and local bronchitis appears, rebellious to all measures, with alternate periods of improvement and aggravation according to the hygienic régime followed.

*P.* Persistent colds among alcoholic consumptives are more frequently observed. As a rule, these are rather stout drinkers, living on drink rather than on food. Repeated colds occur; then chronic, mucopurulent bronchitis sets in, spreading its catarrhal mantle over all areas of the lung to which the tuberculous infection has extended by successive stages. This is what was called forty or fifty years ago the chronic bronchitis of alcoholics. Actually, it is a perituberculous catarrh due to elimination of alcohol through the pulmonary "issue."

*Q.* Aside from these persistent false colds, there are also to be considered evanescent false colds due to the same cause, *viz.*, an "issue" in the lung.

The cases most often met with among consumptives under treatment are the result of errors in the diet. The obese, diabetic, and alcoholic patients already mentioned afford the simplest instances of this group.

After intelligently applied hygienic treatment has caused their perituberculous catarrh to disappear; after their pulmonary lesion has become cleared of any local complicating condition; in brief, after the attempt to regulate their organic functions has proven successful, a mere indiscretion of diet extending over a few days will cause the localized bronchitis to reappear, and this disturbance will persist as long as the error in hygiene is kept up.

Among drinkers who have been made to take water alone, a few glasses of wine prove sufficient to bring about reappearance of moisture in their tuberculous lesion. Their "issue" supplies them with a most discouragingly accurate alarm signal.

*R.* Next to these patients may be considered the readily poisoned consumptives, patients who are close to their high limit in weight or, as it were, nearly up to their saturation point. Quite often these are angioneurotics with more or less marked heart impairment. The least intestinal upset in these patients is reflected in a sudden rise of temperature and immediate unusual moisture of their lung focus. This disturbance may last three or four days, and the patient seldom fails to announce that he has a cold, always seeking to account for the difficulty through some external factor.

*S.* In these same subjects, many different kinds of food are capable of bringing on within a few hours an attack of

local perituberculous bronchitis which is readily mistaken for a cold. A mistake is all the more easily made in that often this pulmonary hyperemia assumes the form of a mild asthmatic attack—a local asthma, as always. The responsibility of recognizing the cause of this disturbance lies with the physician alone, for the patients themselves are rarely disposed to put the blame on their dietary indiscretion. In one case the condition may have been due to eating rare meat at 1 or 2 meals; in another, to eating some form of game, fish, shell-fish, etc. Such a disturbance, frequently met with in the so-called arthritic subjects, is sometimes termed "bronchial urticaria." Whether it is urticarial or not, the skin eruption being often wanting, it is certainly associated with local hyperemia at the point of "issue" in the lung.

*T.* In this group of disturbances may also be placed the congestive attacks caused by iodine compounds. The localized perituberculous bronchitis induced by ingestion of potassium iodide or hypodermic injection of solutions of iodine with metallic substances is a familiar occurrence. It will even reveal, with mathematical accuracy, the smallest and most remote tuberculous lesions in the lungs. This type of false cold is readily detected.

*U.* Two patients, in my experience, developed the same form of local perituberculous congestion whenever tincture of iodine was applied over their skin. In these instances the mode of absorption of the drug was clearly different, and the local bronchitis was accompanied by slight nasal catarrh.

*V.* As a rarer condition may be cited the localized bronchitis occurring at the time of a roseolar syphilitic eruption. In two young men recently infected with syphilis, appearance of a rather abundant eruption was accompanied by

intense perituberculous congestion with increased mucopurulent expectoration, which persisted as long as the skin eruption. These patients were both convinced that they had an ordinary cold.

*X.* Lastly, the following case may be presented as a medical curiosity. A young man who had been suffering from Hanot's cirrhosis of the liver for a number of years contracted tuberculosis two years before I examined him. He had a rather mild though softened lesion in one apex, with superficial infiltration of almost the whole of the upper lobe on the same side. Thanks to a strict diet, he is still apparently in fairly good health, in spite of the more or less pronounced picrocarmine tint of his skin. He expectorates relatively little and under ordinary circumstances has no fever. But whenever, through some disturbance of the liver, the jaundice increases for a few days, advance warning of this change is given by a marked biliary discoloration of the purulent sputum, which is brought up in two to three times the ordinary amount as long as the disturbance lasts. On auscultation during these attacks, a perituberculous congestion or localized bronchitis is detected, embracing the whole area of bacillary involvement in the upper lobe.

The main feature of these various instances of congestion, bronchitis, catarrh or cold, whichever one may choose to call them, among the tuberculous, is that the congestive disturbance corresponds in distribution with the limits of the tuberculous lesions themselves. Experience with these clinical manifestations has demonstrated that if, in some patients, the bronchitis seems to extend outside of the known tuberculous lesions or involve some area in the intermediate and lower portions of the lungs, this is because there have already been located there very small tuber-

culous foci in the pleura or lung which, though silent or practically silent under ordinary conditions, have been enough to attract the congestive disturbance in their direction. Especially should it not be overlooked that the majority of these aberrant foci of bronchitis are located along the course of the interlobar fissures, and these are the points of election of dry pleurisy in ambulant subjects.

**True Colds in the Tuberculous.**—The true cold among consumptives is, as already pointed out, identical with that of the ordinary healthy person as far as its causes and main clinical features are concerned. Indeed, it differs from it only in the fact of its localization in the lung.

The cause of the cold, then, is some form of exposure. The rapidity of onset of the symptoms after the exposure may vary markedly, but, in my experience, it has seemed that the onset occurs even more promptly in consumptives than among the well.

In the first place, do any colds occur in consumptives which strike the lungs at once without previous involvement of the nose, throat, larynx, and trachea? Without being willing to deny the possibility of such an occurrence, I believe it must be very exceptional, for I do not recall having ever seen a convincing instance of it. In some patients, the onset of the lung catarrh is so prompt that at first sight one is led to believe in a direct reaction of exposure upon the lung, whatever the explanation of this reaction may be. But upon further inquiry one discovers that within a few hours the patient, at the time when the first evidences of interscapular fremitus—so characteristic of a cold in these cases—appeared, had already either sneezed, felt some dryness of the throat, or developed hoarseness, however rapidly the succession of these events may have occurred.

These facts are readily understood when one recollects that, whereas in well persons the upper respiratory passages are usually in a healthy condition and resist the progress of the catarrhal process, consumptives nearly always present an abnormal condition of the nasopharyngeal, oral, laryngeal, tracheal, and bronchial mucous membranes, and that along this entire area extension of inflammation takes place as though along a powder fuse.

Whether one recognizes a variety, albeit rare, of cold involving the lung from the outset, or recognizes only the variety associated with propagation from the upper respiratory tract, it is nonetheless a fact that some colds set in with amazing speed, while others reach the lung only after having affected the nose, throat, and larynx for one, two, or three days, with the symptoms customary in these successive localities, though varying in intensity with the individual and in accordance with the previous condition of the separate parts.

The bronchopulmonary disturbance associated with a true cold in the tuberculous subject only remotely resembles the bronchitis following exposure in healthy persons. The physician need not expect to find, upon auscultation, bronchial râles more or less disseminated above and below, from before backward, and upon the sides of the chest, with dry, distressing cough, soon followed by expectoration, at first of "catarrhal" type, and later mucopurulent when the cold has had time to mature. Nothing like this occurs in the consumptive. The cold is here a local one, confined to the regions already attacked by the tubercle bacilli at some time or other. The cold is at the apexes if it is an early case; it involves several areas if the tuberculous process has already become disseminated in various directions; lastly, it involves an extensive though variable surface where a

secondary tuberculous pneumonia is running its course in one of the pulmonary lobes, in the neighborhood of the interlobar spaces or the mediastinum, while, in most instances, the primary apical foci seem to be completely at rest.

(*a*) Thus, a patient presenting tuberculous lesions only in the apexes, having contracted cold, promptly shows on auscultation a few strictly localized whistling râles in these areas, sometimes a little crackling never previously observed, and in a few hours is bringing up appreciable amounts of sputum whereas previously his dry cough in the morning or through the day had been bringing up little or nothing. Parenthetically I may state that a temporary cold is the most useful evidence of all in the diagnosis of incipient, previously unrecognized cases of tuberculosis, for it immediately brings to notice the least agglomeration of granulations beneath the pleura. The reaction here is just as accurate as that produced by ingestion of potassium iodide.

(*b*) When a patient who, after having had a mild and supposedly well cured attack of tuberculosis in the apexes, has been showing for months and years only the small pleuroalveolar lesion which I have designated as *acromial plaque,* catches cold, auscultation reveals for some days more or less "musical" rhonchi in the region of the acromion, and in the morning he will cough up with some difficulty a small mucopurulent mass of the size of a millet seed. The reaction of the cold upon these acromial plaques is just as distinctive and significant of so-called "latent" tuberculosis as that produced on these relatively harmless and frequently overlooked lesions by menstrual congestion in women apparently in excellent health.

(*c*) In a patient with bilateral tuberculosis of the upper lobes, more pronounced on one side than on the other, as is

the rule, the onset of a cold brings about a moist condition of the entire involved area, with more or less musical râles and expectoration rapidly increasing in amount; and if on the more seriously involved side there is already a rather extensive focus of softening, while on the other there is only a certain amount of infiltration, secreting but little under ordinary circumstances, one will frequently note what I have termed *paradoxical congestion.* The catarrhal congestive process resulting from the cold will seem insignificant about the focus of softening, but will be very pronounced on the side with least tuberculous involvement. I have already presented elsewhere a plausible explanation of this paradox.

(*d*) If, in addition to the lesions already mentioned, one apex shows, *e.g.,* infraclavicular pleural thickening, the cold causes sounds rather suggestive of fluid in this area, owing to the serous infiltration induced in the membranes.

(*e*) In consumptives harboring a necrosing pneumonia in the vicinity of the interlobar fissures, accompanied in nine cases out of ten by pseudomembranous pleuritis, a cold immediately enhances all the usual signs of these varieties of lesions; the moist râles now suggest cavities, the murmur becomes tuboamphoric, the pleural sounds develop a singing quality, and expectoration increases. Only exceptionally, however, are moist or musical râles heard outside of the known territory of the pre-existing pleuropulmonary lesions. If there are residua of the primary foci in the apexes, one is quite surprised to find that, as a rule, the cold has practically no effect on them.

(*f*) Finally, a few words should be said concerning colds occurring in subjects cured of former serious lesions and who naturally preserve cicatricial changes of the pleural and pulmonary tissues in the areas in which their earlier

bacillary foci had been situated. Whether these residua consist of pleural adhesions or of nodules of fibrosis in the midst of lung tissue, they constitute for years, if not throughout life, points of lowered resistance to which all catarrhal congestive processes will be attracted. Observation of a number of cases of this type has shown me that here again colds constitute a local process, confined to the territory of the former tuberculous lesions.

In brief, from all the above we may conclude that like the false cold of the consumptive, the true cold of the consumptive is a local disturbance, the location of which corresponds to that of the pre-existing pulmonary disease.

What, however, is the precise nature of this true cold? Is it a simple hyperemia or catarrh due to local circulatory disturbance under the influence of exposure? Does it result from a sudden outburst of activity, under the influence of the shock *a frigore,* on the part of the microorganisms already present in the pulmonary lesions? Or has it become an infectious perituberculous catarrh of the lung through extension of a likewise infectious catarrh of the upper respiratory passages?

(1) Little credence is now placed any more in purely congestive colds without a microbic factor, and I shall lay no stress on this particular hypothesis.

(2) That the germs lodged in the pulmonary lesions—tubercle bacilli, pneumococci, streptococci, *B. tetragenus,* and others—are capable of suddenly developing fresh activity from exposure of the skin to cold, this, in turn, resulting in reflex congestion exerted selectively at weak points in the system, constitutes a defensible thesis, but how it can be demonstrated is not clearly apparent.

(3) The tendency is rather to accept the view that the congestive disturbance in the bronchi and lungs originates

in the infectious catarrh of the upper air passages; this may be supplemented, if desired, with the view of an inhibitory phenomenon, as yet rather obscure, having for its result to render certain regions of the lungs a favorable nidus for the bacterial infection transmitted from above. Among the tuberculous this region of low resisting power is naturally the site of the pre-existing lesion.

What may be definitely considered certain is that in many consumptives whose sputum usually contains the tubercle bacillus in pure culture or practically so, a true cold causes all the exuberant flora of the nasal cavities and oropharynx to appear in the expectoration. On repeated occasions I was able to observe that in the presence of a cold examinations of the sputum for tubercle bacilli are relatively unsuccessful.

All this tends to support the view that the true cold of consumptives results merely from a more or less rapid extension of the infectious catarrh developed in the upper respiratory passages under the influence of exposure to cold.

From the clinical standpoint it is of interest to ascertain just what ultimate effect a true cold may have upon tuberculous areas in the lungs.

In contradiction to the opinion of the patients and their families, who, confusing the false colds with the true, never fail to ascribe to the latter much of the actual progression of the disease, it may be put down as a fact that the ordinary cold is generally a rather harmless disturbance, if treated rationally.

It may, of course, be readily understood that a cold in a consumptive is a complication; that this local disturbance may, by inducing congestion of the pulmonary lesions, whip up the activity of these lesions, either because the tubercle bacillus seizes the opportunity to form fresh foci in the

vicinity, or because it carries on or merely completes processes of tissue necrosis which the patient will later have to eliminate by suppuration, or again, because similar actions are being exerted by other bacteria exalted to activity by the infectious catarrh. Indeed, this is probably the case rather often in consumptives with colds who continue living under ordinary conditions, reckless of all hygienic measures and without even taking any particular care of their colds. These are the instances in which it is really justifiable to speak of a neglected cold bringing about aggravation of the pulmonary disease.

But in consumptives under the hygienic-dietetic cure, who, as a matter of fact, catch cold rather seldom on account of the hardening procedures they are compelled to undergo, colds generally pass off quite harmlessly within a few days, without leaving any permanent traces or aggravating the pre-existing lesions. To be sure, under ordinary circumstances they are not neglecting their tuberculous disease, and when they do catch a cold, do not neglect the latter.

## CHAPTER VIII.

### RESULTS DERIVED FROM THE RATIONAL TREATMENT OF TUBERCULOSIS.

#### I. Duration of the Treatment.

THE tuberculous patient who is curable or merely susceptible of improvement and who agrees to undergo the rational system of treatment must be warned that this treatment will necessarily extend over a long period of time.

It is not, indeed, simply a question of taking good care of oneself for a few weeks. The treatment occupies months and years, according to the original constitution of the subject, the characteristics of his pulmonary lesions, and according to unforeseen circumstances, *viz.*, disturbances which may supervene in a consumptive apparently best situated for prompt recovery.

Our earlier study of the theory of treatment led us to the statement that, in order to wage the fight against his lesions and the tubercle bacilli constituting its exciting cause, the patient must build up his rundown system. Practical experience absolutely confirms this statement, showing that in nine cases out of ten, in consumptives under the hygienic-dietetic treatment, the general condition improves first, and the local condition afterwards. For this reason I often remark that one need pay no attention to the lungs in a patient who is gaining weight regularly. One must not expect, indeed, to see the tuberculous lesions themselves undergo prompt improvement. This improvement takes place when the scales show increased body weight and the patient's strength is returning.

What one does see occurring in a very short time, however, in patients on the open air and rest treatment is a "clearing out" of the pulmonary lesions.

Whereas consumptives at liberty often have fever due to overstrain which supplements, as it were, their apyrexia or true tuberculous fever; similarly, their true tuberculous lesions are often supplemented by or even overwhelmed in a host of accessory disorders.

Consequently, the physician, ausculting his patient after a week or two of rest, may be quite surprised not to find what he had noted at the original examination.

A few weeks are sufficient to eliminate all evidence of these accessory disorders of the ordinary, everyday type and to restore the tuberculous lesion to its true limits. Rest and open air alone are sufficient to accomplish this result.

Thus, from the mere fact that a consumptive previously leading an active life is subjected to the open air and rest treatment, the physician should expect an early improvement in the signs elicited by auscultation. But he must not conclude from this that the actual tuberculous lesion has undergone any change in so short a period of time. The patient's fight really only begins when he has been brought down to his exclusively tuberculous lesion.

Surprising cases of rapid local recovery do, of course, occur. I have seen massive involvements, yielding dulness on percussion, bronchial breathing and increased vocal resonance, disappear in three months. I have also seen small, but definite cavities, shown by all physical signs to be of hazel-nut size, undergo complete healing in the same period of time. I might, indeed, mention several entirely convincing instances of this kind, the patients in question having now remained well for a prolonged period.

In general, however, recovery from tuberculosis is a slower process than that.

This truth may not, at first sight, seem an encouraging one as regards the efficacy of the treatment, but it should be remembered that, if the treatment is so protracted it is because the patients submit to it too late.

The fact cannot be too often emphasized that, even under present conditions of lay enlightenment, the consumptives who can take proper care of themselves do not, as a rule, undertake the systematic open air treatment until they already have rather advanced lesions.

When the day comes when the curable forms of the disease will be detected by the physician from the start and when, thanks to the physician, both the patients and their families will be fully informed of the necessity of immediate treatment in lung disease, from that day the tuberculous patients will get well like the anemics, the chlorotics, or the rundown, *viz.*, after a few months' treatment in the majority of cases. It will even be found that tuberculosis is one of the most readily curable of the chronic diseases, on condition that it be taken early.

One might say, in order to lay ample stress on the matter, that it is *never too early* to treat one's tuberculous infection, but *always too late*.

This is so near to the truth that when, in a sanatorium in which the rational treatment is systematically applied, a number of these incipient cases are brought in at once, the attending physician can practically mark down in advance a corresponding number of recoveries, which, in a few months, will not fail him.

**II. The Rôle of the Patient in Curative Treatment.**

When the physician warns his patient of the prolonged period of time required for treatment, he must also warn him of another very important feature. While the rational treatment and medical supervision are great factors in enabling him to recover, they are not in themselves sufficient. The patient must, in addition, have the will to recover. If he fails to second the physician's efforts in this respect, good results cannot be obtained.

The consumptive should submit completely to the physician's directions, but he must not be merely an inert subject in the physician's hand. The patient who lets himself go through discouragement or simple inertia does not do well. He must, on the contrary, be the physician's most active helper; he must obey him implicitly, but intelligently; he must concentrate the whole of his energy and will power on the one object, *viz.*, that of getting well.

The treatment takes a long time; consequently the patient will do well to take things somewhat philosophically, and, indeed, he will soon do so by virtue of the confidence systematic medical supervision will instil in him.

In tuberculosis, the patients who are determined to win are those first chosen for recovery; and having gone through it myself, I am able personally to attest to the fact that, to recover, great will power is needed when one has been at all seriously attacked.

There are some patients, as I have already mentioned, who, while wholly curable and warned of the seriousness of the matter as well as of the measures required for recovery, prefer to follow the principle of "a short life and a merry one."

There are also some who, with a rather curious state of mind, which is nevertheless not a true skepticism, refuse to

place themselves entirely in the hands of the physician. If it is not skepticism which leads them to do this, it is in some instances an attitude of bravado. These are the consumptives who go about proclaiming that, while they do have one or more physicians, they do not bother to follow their advice. Very seldom do patients of this type obtain good results. Yet they are the first to tremble and quake and lose their heads when the least unexpected trouble sets in. Not a few of them come back to reason suddenly after they have experienced some complication such as hemoptysis.

### III. Results of the Treatment in Different Kinds of Cases.

**Customary Effects of the Rational Treatment.**—The curable patient or the patient who can be markedly improved when placed under the rational treatment soon experiences, however opposed he may previously have been to submitting to it, a mental satisfaction and physical feeling of well-being which eliminates all doubts and hesitation in the matter.

If the disease is at its very beginning, he feels rejuvenated within a few days, coughs only just enough to bring up the sputum, sleeps his nights through, without mentioning the additional naps he takes during the daytime; eats plentifully, feels stronger, and probably gains 1 or 2 kilograms in the first fortnight. In such a case, half the battle is won at once; the patient returns to a state of proper organic equilibrium and thereafter has merely to enjoy life while carrying out the physician's orders.

Among the consumptives who, with restricted or, more often, rather severe lesions, already show an evening fever, there are two possibilities.

The patient who has fever only because he uses up his body in strenuous exercise and is thus suffering only from overstrain fever, finds his temperature coming down to normal within a few days. He begins to take food again in the evening, which he had no longer been able to do, is no longer bothered with nightsweats, and in a short time passes into the preceding group.

The patient who, on the other hand, has not only fever from overstrain but already a tuberculous fever element, spends a longer time in regaining his equilibrium, yet does finally attain it in the majority of instances.

Placed at rest, he begins to show less temperature in the evening, having eliminated the cause of his fever from overstrain. Whereas at first his evening temperature was 38° or 39° C. (100.4° or 102.2° F.), after a few days it reached only 37.5° or 38° C. (99.5° or 100.4° F.). Gradually he is enabled to take twice as much food as before; first of all, he is now able to eat an evening meal, which he did not previously do, and secondly, his strength having returned, he is able to combat the second factor of his fever, *viz.*, the active pulmonary lesion.

To this category belong the cases of some severity; those whose advancing disease is marked by febrile attacks; those whose rather pronounced lesions render the physician unable to predict always the probable termination of the illness, and those who necessitate on his part a ceaseless struggle having for its object to kill the tuberculous fever. Since drugs are not capable of eliminating this fever, he cannot rely on them for the purpose. The fever will disappear only if the patient can succeed in holding the tubercle bacilli in submission and annulling activity in his diseased area.

Nothing definite, therefore, can be said as to the amount of time that will have to elapse before this result can be obtained. The period is subject to great variation according to the severity of the lesions and the original constitution of the patient.

Some consumptives subdue their fever in a few weeks; others require months.

In the second group belong the enthusiastic accounts given by certain physicians of their own recovery from the disease. These are veritable providential events which the consumptives restored to life are not slow in proclaiming to the world.

Physicians who have recovered from the disease are now legion. Not a few have since devoted themselves to the satisfying though arduous task of curing others after they had cured themselves.

In addition to the consumptives whom the hygienic-dietetic treatment cures, however, there are some whom it can only improve.

To describe what eventually becomes of all these different classes of consumptives would carry us beyond the proposed limits of this work.

Nor will any description be given of the special requirements in the treatment of arthritic, lymphaticostrumous, or diabetic consumptives; the behavior of chlorotic and neurotic patients, who hold their tubercle bacilli at bay for so long, often without either improving or growing worse; the tuberculous subjects, mainly of the female sex, who, highly neuropathic or hysterical, heal their lesions, then open them again at will, and ultimately do not always get entirely well, yet regularly live long enough to bury their physicians; the nervous consumptives who get well without gaining weight; those whose illness is complicated with heart

disease; the syphilitic consumptives, etc. Again, there are those who remain invalids as a result of tuberculosis; those with cavities; those who are breathless owing to extensive pulmonary adhesions, and the young arthritics in whom tubercle bacillus infection leads at an early period in life to pulmonary manifestations which they would not otherwise have developed until the age of 40 or 45.

An additional volume would be necessary were all these varieties of the disease to be treated.

**Patients that Must be Made to Lose Weight.**—It seems advisable, however, to refer to that group of tuberculous subjects who must be made to lose weight before they can recover.

This is an interesting clinical group to which allusion was already made in relating the case of a consumptive who began to improve only after losing a number of kilograms in weight, made a good recovery, and in the eighteen years that have since elapsed has never experienced the least return of trouble. Since that time I have found it necessary to bring about loss of weight in not a few cases of more or less advanced tuberculosis, with excellent results. This is, to be sure, not a therapeutic procedure intended to antagonize directly the tubercle bacillus; nor is it a fad; it is simply a procedure the necessity for which occasionally arises and the indications for which it is well to bear in mind.

There are several different types of individuals in whom this plan constitutes the proper course to pursue.

(1) The first group is that of patients already well taken care of as tuberculous subjects, and *apparently completely cured,* who, either owing to bad advice from somebody or other, through habit, or because of fear of a return of the disease, persistently ingest large amounts of food,

take no exercise, and put on too much weight. These patients have remained firmly imbued with the idea of gaining weight as a prerequisite to recovery from tuberculosis, and are continuing to gain weight until morbid phenomena appear, which soon seem to them to suggest a return of the disease they have been so carefully trying—or at least thought they were trying—to prevent. Instances of this sort are rather commonly met with, and they all present practically the same clinical picture.

Here, for example, is a young man 25 years of age who in eight or ten months recovered from a suppurating focus with more or less extensive infiltration of the upper lobe on the left side. He was in splendid general health, without the least evidence of fever, and the local signs of the disease had disappeared. The case was one of apparent clinical recovery which, with a few months more of life under good hygienic conditions should, in due course, have given place to complete cure.

Suddenly, without apparent reason, adipose tissue accumulates on the chest, expectoration returns, sometimes with a slight febrile movement in the evening, but usually without fever. Recrudescence has occurred in spite of all the appearances of sound general health, and the disease aggressively resumes its course. Upon weighing the patient he is found to be a number of kilograms heavier than the theoretical weight which had been thought applicable to him. This extra weight, however, is not accounted for by a well developed musculature, but by adipose accumulation. If the exposed trunk and thighs are palpated, pressing the skin together laterally as though to make a broad fold in it, it will often be noticed that the subcutaneous fatty tissue has become lobulated into small, visibly prominent, rounded masses. This is a very common feature in subjects with

overdeveloped fatty tissue, and one should be constantly on the watch for it in many consumptives when an attempt is being made to force the patient up to heavier weight.

Upon auscultation the physician at once notices that the tissues in the region of the old lesions have become moist again. The expectoration is mucopurulent or frankly purulent as it had been before; as a rule, however, the tubercle bacilli in it are rather few, or may even be apparently absent.

In conjunction with these major evidences upon which a diagnosis of recurrence is based, there occur a host of minor ills betokening what might in a normal individual be considered signs of an exuberant state of health, of a congestive or overburdened condition, in a word, of plethora and slowing of metabolism.

To get rid of all this it is necessary and sufficient to have the patient lose his excess of "flourishing" health. His organic income and outgo must be restored to proper balance through restriction of his diet in one or more directions and by having him take exercise. He will then rapidly lose a certain amount of body weight and build up muscles instead of fat, and the region of the former pulmonary lesions will with surprising speed "dry up" again and return to the condition of apparent recovery previously existing.

In a tuberculous subject with marked congestive tendencies, a mere quantitative reduction of the food taken is not always completely successful; it then frequently becomes necessary to make qualitative changes in it, the meat, for example, being either reduced or forbidden.

Learning by practical experience, the patient will then know that in future he must not allow himself to exceed a certain definite weight, even by a single kilogram.

It should be noted, to be sure, that both quantity and quality of tissue are of importance in relation to the body weight. Thus, a given patient may do poorly with a certain amount of "unhealthy" adipose accumulation and yet, after a radical change of hygiene, be in excellent condition at the same weight provided this weight includes a satisfactory amount of muscle tissue. Some men of rather small stature, following a well directed, rational tuberculosis treatment, do not build up fatty tissue at all, but develop muscle, and readily, without prejudice, reach a weight well above the theoretical weight that one would have considered sufficient in their cases. This occurs often, indeed, among persons who when in health are spoken of as being stocky, with well-developed muscles.

(2) In a second group are to be placed tuberculous patients under treatment who, as a result of uncalled for hygienic measures, of inactivity carried to excess, of overfeeding, and of inordinate use of tonic and reconstructive remedies, have succeeded in gaining considerable weight, weighing more than their stature warrants, and yet, to their great surprise, have failed to recover. Among these cases are some already overweight when tuberculosis set in, while the remainder have become more or less stout during their treatment.

It should be noted that among these patients there are some in whom the tuberculous lesions are probably curable, while in others they are probably incurable. But if hygienic methods are not radically changed in all of them, they will do equally poorly. If, on the other hand, energetic measures are taken, the incurable cases, previously sinking rapidly to a fatal termination, will be observed to regain a variable degree of viability—sometimes for a very prolonged period, in the face of their pulmonary disorder—while the

curable cases, whose lesions were clinically at a standstill and could have only advanced rather than retrogressed, will be found to resume their progress toward recovery. With but few exceptions, they will all derive prompt benefit from the change, and this benefit will restore their confidence in the future, although previously their condition had seemed desperate. As a matter of fact it is not always an easy task to inculcate in a consumptive, who has been conscientiously striving for months to gain weight like a prize turkey, the fact that the added weight he has secured is actually harmful or even dangerous and that he must now turn about, reduce his food intake and take exercise in order to substitute for his "stuffed goose" variety of overweight new tissues of a higher order, *viz.*, muscle tissue, and to rid all his internal organs of the mantles of fat with which they are overburdened and which impede their respective functional activities. It is a fortunate circumstance that under these conditions patients are able very soon to notice results, *viz.*, that the chest is becoming more and more free, that they are coughing and expectorating less, that the thermometric readings may on occasion even descend in the evening, that they are becoming better able to get about, and at the same time are being delivered from a number of minor inconveniences necessarily associated with adiposity. They finally come to understand that fatty accumulation is not a guarantee of good health.

(3) In a third group are comprised subjects already obese for some reason or other in whom tuberculosis becomes implanted or simply comes into activity at some time during life. A few of these, not always readily classified, belong to the preceding group. There are also those who have been obese since childhood or adolescence, have inherited obesity, or have acquired it through pre-existing

predisposition and through faulty hygiene as an exciting cause. There are also some obese patients, not as yet clearly defined, who are regarded as suffering from disturbed function of the endocrine glands; and likewise, the obese suffering from diabetes, simple glycosuria, glycosuria with albuminuria, etc. In these the problem is less readily solved, primarily because of our present lack of knowledge of the underlying cause of many of these cases of abnormal fat deposition. Tentative efforts at treatment will have to be made by quantitative or qualitative dietary restrictions, exercise, massage, rubbing, hydrotherapy, not to mention opotherapy, consisting of the administration of products from one or more ductless glands, which in some instances yields notable results.

The cases of obesity of tuberculous origin, rather widely discussed in late years, may be included in this group. Careful investigation is advisable before the existence of such cases is accepted. Obesity is not necessarily a result of tubercle bacillus infection because it coexists with pulmonary tuberculosis, more or less manifest or overlooked up to that time. It should be borne in mind that out of a hundred people walking the streets, at least eighty—to be conservative—have been or are at the time tainted with tubercle infection. Nor should it be forgotten that familial obesity, admittedly inherited or acquired through organic sluggishness, constitutes a favorable soil for the development of tuberculosis. Finally, it is a well known fact that frequently the obesity of the consumptive, treated as such, is not actually a result of the tuberculosis, but rather of an ill considered plan of treatment.

### IV. Hygiene upon Recovery.

Let us consider first the patients already referred to as the invalids of tuberculosis. Whether harboring tubercle bacilli for an indefinite time or, after being apparently rid of the germs, they continue to have incurable lesions of the ordinary kind, they are naturally compelled to live under more or less strict hygienic restrictions.

Patients of this class, who necessarily acquire a considerable amount of medical information regarding their affliction, have learned by experience that, while partly engaged in some definite line of useful work, they must spend as much of the time as possible in the open air, refrain from attending social gatherings unavoidably associated with bodily fatigue and vitiated air, lead an absolutely regular life, eat rather heartily, and refrain from all physical activity that is fatiguing either through the violent exertions entailed or its prolonged duration. Each must, and knows how to, follow a mode of life adapted to his own special needs.

If strong, the patients may spend the winter in any convenient locality; if more sensitive, it will be better to spend the more severe months of the year in a milder climate. Wherever they are, however, they must bear in mind that they are invalids and not well persons.

The patients who have "recovered" fall into two groups, definitely distinguished by the following characteristics:

There are some consumptives who, subjected to treatment from the beginning of their illness, are relieved of all the symptoms and objective evidences of the disease in a few months.

At the termination of their treatment they are free of cough, expectoration, dyspnea, and all other disturbances,

even exercise inducing no unpleasant reaction. Their weight is satisfactory, often even slightly in excess, and to all their associates they appear to be in splendid health.

Here an important question arises. Just when are they to be considered cured? To this question the following unequivocal answer may be given:

A physician who, in a patient in the circumstances just referred to, is unable to find upon repeated auscultation, carried out with due care, any sign of pulmonary disease must be prepared to grant that, at that particular time, the patient is in a state of *apparent recovery*. However excellent the patient's health may seem, he must warn him that he has only *apparently* recovered; that if he is to secure *true recovery*, he must submit to the rational treatment for a year more to the extent that, while the measures required may be less rigorous, he must remain continuously under medical observation, and that he cannot consider himself to have actually recovered until after this test year has elapsed with entire freedom from any manifestation suggesting renewed activity of the disease.

This test year is manifestly a stumbling block both to the physician who must impose it and to the patient who is compelled to undergo the test. Unquestionably it is one of the greatest obstacles to be surmounted on the path to recovery.

The physician is obliged to fight for it both against the patient, the patient's family, and material circumstances opposed to it. In truth, although the physician is firmly convinced of the urgency of this test year, the laity is not readily convinced of its need.

When, after several months, or frequently a whole year, a young consumptive who has been induced to submit to the treatment only with difficulty, because he felt well or nearly

well, finds himself returning to ordinary life, apparently in splendid health, and when the physician informs him that he no longer shows any signs of tuberculosis on auscultation, it is only natural that this "ex-patient" should protest vigorously against the life of inactivity he is being asked still to continue. It is only to be expected that he should insist upon resuming his life at the point where he left off six months or a year before. It is only natural that he should insist that "he has had enough of it," as nearly all of them say—enough of doing nothing, enough of foregoing all amusements if he is well off, enough of remaining idle if the period of treatment has meant a marked financial sacrifice to him.

Then the family comes to see him; or else the physician, unable to do otherwise, allows him to spend a few weeks at home. His parents and friends, in ignorance of the true condition of affairs, find him in splendid health and talk to him in a most prejudicial manner. "My dear friend, you have never been in such excellent health; you have never even been ill. You cannot make me believe that you had tuberculosis. It is ridiculous to stay idle when you are as strong as you are now, etc." How many patients, already themselves disposed to consider their illness as ancient history, succumb to this sort of talk! How many patients eventually become ashamed of being spoken of as lazy persons! They finally come to believe, themselves, that they have never had the disease.

The unfortunate result of all this is, very often, that the physician never sees them again. Or if he does, he sees them only six months later, when the disease has already been restored to full activity.

In sanatorium practice, unfortunate occurrences such as these are only too commonly met with. Few patients are

willing to spend a year or eighteen months without leaving the institution. As soon as apparent recovery has been obtained, or even before, they find it necessary to be set free. They want to go and spend the summer in the country, where, according to their statements, they will know just how to continue the treatment themselves. Once away from the institution, they take proper care of themselves for two weeks, then gradually yield to other influences about them, and a few months later return to the physician coughing and expectorating afresh. After this setback it will take them altogether two or three years to obtain complete recovery, whereas otherwise they would have secured it in a year or eighteen months. Some of them, indeed, are no longer able to secure it at all!

To repeat, then, the patient who, after six months or a year of treatment, has apparently recovered, must undergo an additional test year in order to secure his recovery beyond all doubt.

Circumstances are even more trying in the case of consumptives with more advanced pulmonary disease who get to the point where they no longer cough nor expectorate and feel practically well, except that they still experience slight dyspnea, either continuously or upon exertion.

When can the physician affirm that such a case has recovered?

Seldom do tuberculous patients of this category, free of cough and expectoration, strong and in apparent good health, fail to show some indication of the local pulmonary disease upon auscultation. In one case, there may be persistent impairment of resonance at one or both apexes, with rough breathing; in another, a more or less blowing type of respiration; in a third, pleural friction or crackling; often, there is reduction of respiratory amplitude, with an inter-

rupted, jerky vesicular murmur. These signs are due to scar tissue or to pleural adhesions.

In my estimation, apparent recovery may be spoken of in such cases when for a certain period of time—*e.g.*, three months, if one must set a definite limit—there has been no cough, no expectoration from the lungs, and consequently no tubercle bacilli, nor any constitutional reaction upon undergoing a special exercise test.

Due allowance should, of course, be made for the slight dry cough a recovered patient may show if he happens to run, walk rapidly, laugh very heartily, etc.; such coughing is devoid of significance in this connection. Sputum eliminated in the morning or even during the course of the day and derived from the pharynx through hawking—a symptom frequently noticed among the tuberculous—must, furthermore, be distinguished from true sputum derived from the lungs.

Under these conditions, then, the patient may be considered to be in a condition of apparent recovery. Before actual recovery can be stated to have occurred, a much longer period must have elapsed than in tuberculous patients of the first group. Here it is a matter, not of a single test year, but of a test period of several years.

It must be borne in mind, indeed, that these patients have been enabled to recover only through more or less extensive cicatricial fibrosis, either in the lung tissue alone or in both the pleural and lung tissues. In this scar tissue there are very likely to exist encysted tubercle bacilli, which unfortunately are highly resistant. Formation of these scars and adhesions, moreover, if they are to be sufficiently firm to withstand any stress placed upon them, takes considerable time—though just how long cannot be stated, in the light of our present knowledge.

The only conclusion that can be deduced from the above would seem, therefore, to be as follows:

Any patient in a condition of apparent recovery who continues to exhibit manifest auscultatory signs must understand that he is liable to a recurrence of the disease at some future time. Therefore, after having progressed to apparent recovery under the physician's observation, he must not only undergo a year's probation, but should consider himself convalescent for several years longer.

Obviously the above constitutes merely a general rule applicable in the average case. Many tuberculous patients continuing to exhibit a few slight auscultatory signs correspond more closely to the recovered cases of the first group. The longer the period elapsed since apparent recovery, the greater the chances of ultimate permanent recovery.

Yet the clinical instances are there peremptorily to demonstrate the necessity of prolonging the treatment in all cases.

The facts already recited plainly lead to the conclusion that during the first few years following apparent recovery the consumptive who continues to show residual evidences of a serious lung lesion must constantly keep a careful watch over himself in order to avoid all factors that might bring about recurrence. Aside from the required general hygienic measures, as already described, the subject, whose convalescence is to continue for several years, must abstain from violent exercise, especially of the upper extremities, which might lead to rupture of pleural adhesions. I know perfectly well that these wise recommendations are only too often disregarded; but the physician should nevertheless persistently make these recommendations, for when they are disregarded unexpected hemoptysis and recrudescences of the tuberculous process frequently occur.

At all events, there are hosts of "cured" consumptives, with or without evidences of their pulmonary lesions manifest upon auscultation, who are at large, mingling with other persons, following all manner of occupations, and even oblivious of the fact that they had ever been ill. A goodly number of them dwell in large cities, are married, and have healthy-looking children, concerning whom the question of tuberculous heredity need not or should not be even raised, as they are no more liable to attack by tubercle bacilli than any one else. Indeed, these children are actually the offspring of persons in a perfect state of health.

At this point the question of *marriage* of tuberculous subjects who have recovered may appropriately be considered.

In a subsequent chapter mention will be made of the marriage of subjects with active tuberculosis. The latter may well be referred to here as a fundamental principle, however, that no person with active tuberculosis should marry. Where recovery has taken place he may, on the other hand, marry, but only under the following conditions:

Recovery must be actual and not merely apparent. A recovered tuberculous subject who presents evidence of his pulmonary lesion, who has a satisfactory general condition, and whose appearances is in excellent health, may marry [illegible] his test year, *i.e.*, at least two years after the apparent recovery.

The apparently recovered consumptive, on the other hand, to show beyond evidence of pulmonary lung disease must be compelled to allow several years to elapse from his apparent recovery before he marries.

These ex-consumptives must, furthermore, for a time after their marriage—obviously the period attended with

greatest risk—exercise somewhat unusual precautions as to conjugal hygiene.

Under such circumstances, enjoying all the attributes of perfect health, they may proceed to procreate without any especial apprehension, at least as regards any prejudicial influence of the former illness upon their offspring.

On the other hand, tuberculous subjects in a state of recovery who, in spite of a most satisfactory condition of lung repair, continue to show poor general health, generally because they were originally weaklings—some few of these recover in the face of such a handicap—must abstain from marriage or avoid having children; for these persons would already have had weak offspring even if they had not contracted tuberculosis, and their illness, however completely they may have recovered from it, cannot in any wise be held as having improved their chances of having robust children.

Thus, on the whole, the same rules apply in tuberculosis as in syphilis.

A strong syphilitic individual, if he happens to seek medical advice on the subject, is generally allowed to marry after he has undergone prolonged, systematic treatment and has shown no active evidences of the disease for several years. Even under these conditions, he is urged to submit to a course of active mixed treatment by way of prematrimonial hygiene, in view of the probable subsequent procreation, and as post-matrimonial treatment, to undergo one or two mild courses of iodide treatment each year. With these precautions, as is well known, the children subsequently born are nearly always free of the syphilitic taint. To some syphilitics, however, marriage is forbidden. These are the patients in whom the disease blossoms out afresh, as it were, from time to time in spite of all therapeutic

measures applied, or the patients who, although apparently cured thanks to unremitting treatment, show such an unsatisfactory state of general health that specific inheritance in the children may nevertheless be apprehended. In such instances, celibacy or an unproductive marriage is best recommended.

## CHAPTER IX.

### SANATORIUMS.

THE seemingly simple plan of treatment which consists of rest, breathing pure air constantly, and taking plenty of food is, as already pointed out, not as easily applied as one might at first thought believe. The expectation that hygienic measures alone or with slight other assistance will restore weakened bodies and even impart unusual vitality to them is one demanding a prolonged period for its fulfillment. Such treatment, moreover, at the start meets with some degree of antagonism on the part of the patient, because of its monotony. Unusual will power is, indeed, required to submit to it and continue it without external aid. Knowing how to be idle for a considerable time is in itself a matter of some difficulty.

Following the treatment alone, therefore, is a procedure available only in a small minority of cases. Many a patient has undertaken the task, but very few have carried it out to a finish.

A considerable number of obstacles interfere with the execution of the patient's good resolutions where he attempts to treat himself alone though already seriously ill.

In the first place he is subject to the annoyance of being without company and of being left all day long in doleful meditation.

Again, he is exposed to the coddling and talk of his family associates, little inclined to restrict to proper limits their attentions to the patient—attentions that are well-meant, to be sure, but which too often prove annoying and irritating and constitute actual obstacles to proper treat-

ment. As already emphasized, tuberculous subjects must not be too much coddled. If they are to have complete confidence in the course of treatment being carried out to save their lives, such treatment must be supervised by a strict person. Such a person is seldom to be found among patients' families. The physician is practically the only person having the necessary authority to impose upon the patient all the measures required in the treatment..

How many patients are financially able to have constantly by their side the physician with authority, in whom they have complete confidence?

As a general rule, they see the physician only occasionally—possibly every day, but then only for a few moments, just long enough to make certain good resolutions which they then proceed to forget in the succeeding hour.

Or, if the tuberculous subject is not in a sufficiently serious condition to experience a spontaneous desire to rest, *i.e.*, if he is an "ambulant" consumptive, as such cases are termed, he never has the will power to resist the temptations placed before him by surrounding conditions. The least excuse is enough to cause him to leave his rest chair, and he succumbs to all temptations one after another. Indeed, it is only natural that he should do so, ignorant as he is of the essential features of the treatment, since it is a matter of daily observation that even consumptives accustomed to the treatment in a special institution fail to withstand temptations when they try to continue treatment at their homes.

It is to eliminate these difficulties that there have been established special institutions for the treatment of the tuberculous—institutions in which the patients live together, keep one another company during the treatment, and are subjected to the cure in common under the constant super-

vision of an experienced physician, who forces them to undergo proper treatment by virtue of his unquestioned authority, teaching them what they must do and, to even greater effect, what they must not do. These institutions are the so-called sanatoriums for diseases of the chest.

Here the consumptive really does take care of himself. Here he is certain to find what he needs in the way of living requirements and medical supervision. Here do the patients, owing to constant contact with one another, owing to a species of unconscious emulation, acquire that complete discipline of the body and mind which constitutes the fundamental feature of the treatment. Here, finally, do they see others recovering and learn to recover themselves.

In a sanatorium, nothing is left to chance or the whims of the patients. Living apart from their relatives, they see no reason why they should not submit cheerfully to all the requirements of the treatment, especially since they are witnesses, meanwhile, of the favorable effects of the treatment in their neighbors.

It should be noted, moreover, that in sanatoriums all necessary measures are taken for purposes of individual and collective hygiene of the tuberculous patients. All precautions relating to the destruction of sputum and the disinfection of articles used by the patients are strictly taken. Thus it may be said with good reason that transmission of the disease is much less to be feared in the sanatorium, though exclusively occupied by consumptives, than it is under other conditions, where tuberculous subjects are at large without any official label warning of the disease they harbor. Transmission simply does not occur in sanatoriums. This is the best possible evidence of the dangerous properties of sputum, since destruction of sputum proves sufficient to prevent the propagation of tuberculosis

in an institution in which the rather numerous personnel is taking care exclusively of consumptives.

If such is the case within these closed establishments, the same thing must apply with even greater certainty in respect of the surroundings of such institutions. Indeed, to speculate upon the risk for a given neighborhood attending the erection of a sanatorium in the vicinity of a number of private dwellings is quite superfluous.

On the other hand, what *is* dangerous in a given locality is a free tuberculosis station, of which there are many, distributed in various parts of the country. Here the consumptives, living at liberty, following their own whims, perhaps intermittently counselled by a physician but not definitely under his control, carelessly void their sputum on the ground wherever they may happen to be and scatter over the land myriads of tubercle bacilli, some of which do not succumb before reaching a new host.

No attempt need here be made to present an account of the history of the sanatorium. Suffice it to state that at the present time there are sanatoriums in almost every district, at all habitable elevations, from 150 meters (492 feet) up to 1800 meters (5900 feet).

Similar curative results are obtained wherever a sanatorium may be located. Consumptives recover in temperate climates just as well as in cold climates. Elevation plays only a secondary rôle in recovery. The most convincing proof of this is that perhaps the best results from sanatorium treatment have been secured at Falkenstein, situated at an elevation of only 450 to 500 meters (1475 to 1640 feet) and with, as a rule, rather misty weather.

It has often been said, and will bear further repetition, that no climate exists which will cure tuberculosis. There may exist, however, a therapeutic method that will give

better results in a certain climate than in another; or a method giving variable results according as a given physician applies it with more or less skill and experience. As has been remarked, too, a sanatorium is no better than the physician in charge of it.

Not only is there no specific climate for tuberculosis, but according to the individual patient's make-up and the type of the disease from which he is suffering, a given patient may almost or quite recover at low altitudes who would have rapidly lost ground at a high elevation, and *vice versa*.

The conditions sought in establishments at high altitudes are, pure air, some degree of rarefaction of the atmosphere, stimulation of the entire system by the more brisk air, and increased intensity of the sun's rays—all conditions which excite functional activity of the organs and activate body combustion.

To believe, on the other hand, that it is enough simply to dwell at a high elevation and lead one's ordinary life there to recover, can result only in egregious disappointment. Daily experience with patients allowed to remain at large in mountain resorts is amply sufficient to demonstrate this. There, as elsewhere, the patient must submit to the individual hygienic regulations already described. Whether he be in the mountains or in the plains or at the seashore, he must take proper care of himself everywhere. How many French people have thought that by spending the winter at Cannes or Mentone and the summer in Switzerland, as a pleasant sort of vacation, they would get well! How many have succumbed while "treating" themselves along these lines!

The excellent results obtained in sanatoriums at moderate altitudes, and the success achieved by these institutions, are due simply to the fact that they meet the requirements

of a majority of the cases that present themselves for treatment in the practice of diseases of the chest. Furthermore, the fact that they are located in intermediate types of climate, neither too hot in summer nor too cold in winter, permits of their remaining open all the year round. This is an essential factor in the true sanatorium, along with good medical supervision.

## CHAPTER X.

### UTILITY OF THE SANATORIUM.

**Proper Collation of Statistics.**—In the last thirty years much statistical matter concerning recovery, improvement, and death following various methods of treatment has been published. In a general way it is conceded that under well directed open air treatment 20 to 25 per cent. of consumptives recover. Such a result seems but meagre in view of the enormous distribution of the scourge, yet it is already a goodly benefit when one recollects the formerly accepted axiom that tuberculosis is incurable.

At bottom, however, all such statistics are of but slight value, for tuberculosis is not now a disease which lends itself to recovery statistics. It is not an affection running a rapid course, for which medical advice is sought from the outset, and in which all cases, mild, severe, or even very grave, are comparable in respect of a given therapeutic procedure, as are, *e.g.*, typhoid fever, diphtheria, small-pox, pneumonia, etc. With these diseases it is possible to state, *e.g.*, that a given plan of treatment, applied in 100 cases of pneumonia, gave Dr. A. such and such a percentage of recoveries and another treatment gave Dr. B. a different percentage; that in a given hospital service 6 typhoid cases out of every 100 die, whereas in another 18 die. There is no occasion for anything like this in chronic phthisis, for under the conditions in which patients apply to the physician it is not precisely tuberculosis he is called upon to treat, not the actual disease tuberculosis, but individual subjects already more or less run down as a result of it.

Whether the physician is engaged in private practice or is medical director of a sanatorium—for hospital patients are little concerned in the question, in a general way—he is required to treat all possible varieties of tuberculous subjects, from the mere beginner in the disease to the advanced case in which death is more or less immediately imminent. Between these two extremes is the great mass of consumptives who are on the border line separating the admittedly curable from the admittedly incurable. The physician, however extensive his experience may have been, cannot always tell whether such and such a case will tend in one direction or in the other. Surprises occur in both directions, pleasant when a patient apparently doomed prospers and distressing when the opposite course is witnessed. Yet, on the whole, there are certain indications which, taken together, constitute a significant aggregate of probabilities and which will enable the physician to establish a prognosis in the individual case at a glance.

Accordingly, tuberculous patients may be placed in two groups—those that should recover and those that should succumb, in view of the various probabilities upon which the diagnosis may be based, and with due allowance for a few cases concerning which there is an undue amount of doubt.

Upon this basis it seems logical to adopt as a unit for statistical studies only the patients who have fair chances of recovery—at least in relation to a plan of treatment for which no claim of specific virtue is made, as is the case with the "rational treatment." It must not be overlooked, indeed, that this treatment is directed, not toward a disease but toward a patient, and that in the case of a subject completely run down or harboring disease areas of excessive extent, it modestly confesses its impotence. Its task

is already one of sufficient importance in the case of patients who still have chances of recovery.

But this is not all. If a plan of treatment is to be credited with successful or unsuccessful results in a given series of patients, it is essential that these patients should continue to submit to the method until death or recovery. Now, tuberculosis is, even at the present time, the affection which is least reliable in its response to therapeutic procedures. In practice, these patients consult all available physicians, not to mention all practitioners who are not physicians; even in sanatoriums, how many consumptives, dissatisfied with the rate of progress or some other circumstance, go elsewhere to seek more rapid recovery!

In last analysis, the number of patients who submit uninterruptedly to systematic treatment is always rather small.

Strictly speaking, it is only to this relatively small proportion of consumptives that statistics referring to the ratio of recoveries resulting from the rational treatment of tuberculosis are applicable.

In some statistics, one finds the patients grouped in accordance with the time-honored division of phthisis into three distinct stages, apart from the period since termed the premonitory stage or stage of germination. From the pathological standpoint, this older nomenclature of the several stages of tuberculosis is of service in the description of the attending pulmonary lesions. The advance of tuberculous infiltration, the softening of the tubercles, and the formation of cavities are universally understood from a mere statement that the disease in a given case is in the first, the second, or the third stage.

From the clinical aspect, however, all this is of but relatively slight significance, for the really important factor, as a rule, that which truly represents the stage of the patient's

illness, is not the intensity of the tuberculous process at any given point, but the extent of the disease, in whatever stage it may happen to be. Some consumptives of the first stage are already moribund, while other consumptives, though in the third stage, are but slightly ill, and may even present all outward appearances of good health.

Clinically, therefore, the prognosis appropriate in any given tuberculous case cannot be regularly based upon the pathologic stage of the pulmonary disease foci. To assert in a statistical statement that such and such a number of consumptives in the first, second, and third stages have been cured is of but little definite value.

So much for the fundamental factors in case statistics. The only remaining point to be settled is, what cases may be counted as having been cured.

Customarily, the only cases considered cured are those that never relapse; those that remain in good health for years and years after they have been declared cured by the physician. But this is an entirely wrong conception.

As a general rule, one is able to follow up the cases that have been discharged cured. But how many others are lost sight of entirely; how many die of miscellaneous other causes, of whom nothing is ever heard! Even this is not of such great importance, for in recovered cases that have been followed up in remote localities, a definite time interval elapses and the recoveries can be considered to have been permanently acquired.

But in addition there are numerous patients who, after achieving recovery, but before the recovery has been confirmed by time, resist all the entreaties of the physician to remain further under his care, return to their former mode of life, are attacked by the disease once more, and succumb as consumptives.

Are these cases to be counted among the unsuccessful group? Is the method itself to blame if a given individual, after having recovered, behaves in such a manner as to throw away his recovery? Is it responsible for this form of suicide? Undoubtedly, no. When a person has been made to recover from tuberculosis by treatment, in 9 cases out of 10 it is his own fault if he subsequently dies of it, unless circumstances are such as to compel him to discontinue treatment. Even if he does succumb, this does not mean that previously he had not been actually cured.

Consequently the consumptives who, after an initial recovery, again become consumptive must not be statistically counted among the unsuccessful cases. Actually they have been brought into the cured column by the treatment, and they should remain there.

Moreover, if a consumptive who has been in a state of recovery for a year, two years, or even longer, becomes ill again because he did not do what was necessary to maintain recovery, and if this consumptive, treated anew by the same method, recovers once again, he must be counted as an additional case of tuberculosis cured. To the physician, he is not the same patient as he was the first time.

To reach a proper conclusion from the above factors, it is necessary to have a criterion as to when recovery has occurred.

According to what has been said in an earlier chapter, this criterion should lie in what was spoken of as a recovery *confirmed* by one or more years of probation. Here again, however, we have unfortunately an impracticable plan. For the physician is not always able to exact this or these years of probation from his patients.

There remains no alternative but for us to be satisfied with what has been termed *apparent* recovery.

Since it is an observed fact that apparent recovery, when asserted by the physician to have occurred under acceptable conditions, is equivalent in 9 cases out of 10, if not always, to permanent recovery if the patient *wants to* and can take the proper hygienic precautions indicated in cured tuberculosis, and that it is almost invariably by reason of errors of hygiene that he falls back into the disease—a circumstance for which the physician cannot be held responsible—it is perfectly justifiable to accept such an apparent cure as a criterion of recovery.

It should be carefully noted again, however, that apparent recovery can be stated to have occurred only under the following conditions:

The patient has had no expectoration or lung cough for a definite period, say, three months. He has been restored, from all outward appearances, to perfect health. He develops no trace of a reaction after ordinary exercise, nor after exposure to any of the other ordinary causes which awaken such an organic reaction in subjects with active tuberculosis.

On the basis of these two conditions, *viz.*, on the one hand, the variety of the patients that may justifiably be taken into account in statistics, and on the other, apparent cure accepted as a criterion of recovery, a legitimate statement of the successful and unsuccessful results from the rational treatment of chronic tuberculosis can be made, just as a statement can be made as to the efficacy of various treatments in other diseases.

Under these conditions I have felt no hesitation in asserting that 80 per cent. of the consumptives that seem susceptible of cure when the physician first sees them should actually recover, the remaining 20 per cent. comprising, on the one hand, patients that have been wrongly

classified in the curable group (*errare humanum!*), and on the other, patients whose regular progress toward recovery has been interrupted through some unfortunate circumstance or other.

It seems unnecessary now to dwell extensively upon the statistics which include a supplementary column for improved cases.

In any account of the results obtained with a given method in the treatment of tuberculosis, the term *improvement* means simply that the patients have not been kept under supervision long enough for them to either die or recover. Under open air treatment all tuberculous subjects improve. In some, this improvement constitutes the initial step on the road to recovery; in others it is merely a period of arrested progress, a new lease of vitality before the fatal issue.

The patients I have termed the invalids of tuberculosis are not, of course, to be included in this group of the improved cases. The meaning attached to this term, as has already been implied, is as follows:

The tuberculous invalid is a patient who may no longer harbor tubercle bacilli, but who continues to suffer from lesions of common (non-specific) causation, on account of which he has remained a pulmonary invalid. Or, he may still be a tuberculous patient, but one who has secured such amelioration of his general and local disturbances that he may be considered, relatively, to have recovered; for this reason, there is little more chance of the patient's dying from the activities of his few remaining bacilli than there is from any other cause.

**Statistical Results.**—During the thirty years that I have been taking care of sanatorium patients, I have pub-

lished accounts of the results obtained, on the basis of the criteria just described, on three separate occasions.

The first statistical series yielded the following figures:

Out of 250 consecutive cases, included whether but slightly ill or moribund, 150 appeared to be curable and 100 incurable.

Among the apparently curable cases there were 60 per cent. of recoveries, and among the incurable, 2 per cent.

Taking the series as a whole, there were 38 per cent. of recoveries.

The second statistical series comprised 515 consecutive cases, the initial examination of which caused 257 to be classed as curable and 258, *i.e.*, one-half, as incurable.

The curable cases yielded 71 per cent. of recoveries.

The third series comprised 850 consecutive cases, divided into 424 curable cases and 426 incurable. The curable cases yielded 296 recoveries, or 70 per cent. The incurable yielded 32 recoveries, or 7.5 per cent.

Taking the 850 consecutive cases together, recoveries numbered 328, or approximately 39 per cent.

Lastly, of all these consumptives, 197 were still in fair condition—some more or less invalid from phthisis; others living on good terms with their lung disease and bacilli; others still, under treatment since years or many months.

Comparing the three statistical series, two important facts are readily discerned:

(1) Formerly, the patients sent to the sanatorium were divided into 150 curable cases as against 100 incurable. Gradually the number of incurable cases came to equal the curable cases. It must be well emphasized, moreover, that in spite of himself, the physician accustomed to witnessing the resurrections secured by means of the rational treat-

ment classes among the curable cases at his first examination many patients who should not be thus grouped.

(2) The percentage of recoveries reached 70 per cent. instead of 60 per cent. among the apparently curable cases. Among the apparently incurable cases it jumped from practically *nil* to 7.5 per cent.

On the other hand, the ratio of recoveries in the entire series of cases in all stages remained throughout at 39 per cent.

Our fourth statistical statement comprises 1200 patients of all categories, divided on arrival, according to the best idea that could be formed of them from the initial examination, into 598 curable and 602 incurable cases. It must be again noted, however, that the farther one proceeds, the more the consumptives sent for treatment tend to be of the apparently incurable type. In spite of this, the percentages are the same as in the earlier statistics, *viz.*, 39 per cent. of recoveries in the whole series of 1200 consecutive patients, and 70 per cent. of recoveries among the group of cases in which hope of recovery could be entertained.

Finally, a last account comprising 1700 patients may be presented. The ratio of apparently incurable cases again showed an increase, but nevertheless the recoveries showed the same ratio as in the earlier statistics.

It is commonly said that figures demonstrate only that which one desires to have them demonstrate. Yet when the figures are completely presented, free of all artificial factors, they must be given due credit.

As we have seen, that which I termed "apparent recovery" was taken as basis of the percentage of recoveries.

In last analysis, due attention must be paid to the fact that in spite of the increasingly serious condition of the

patients reaching the sanatorium—the number of incurable cases continuously increasing—the general ratio of recoveries remained throughout at 39 per cent. It is highly probable that if the earlier ratio of curable and incurable cases had been maintained, this percentage would have been largely exceeded. Besides, the number of recoveries among the apparently incurable cases underwent a marked increase.

All this indicates, if I am not mistaken, that the plan of treatment followed has been continuously improved.

These results of the rational treatment are decidedly gratifying, and afford striking proof of an assertion I made over twenty years ago, and which I shall repeat here:

If all cases of pulmonary tuberculosis were treated in time and in proper fashion, 80 per cent. would recover, the remaining 20 per cent. comprising that group of patients who, through constitutional inferiority, are unavoidably the prey of chronic or of more or less acute tuberculosis.

It may be added, furthermore, that if the tuberculous were always cared for promptly, acute forms of the disease would in all likelihood be rare.

While awaiting the appearance of an effectual serum or vaccine, this will always be a consoling thought.

**Recovery from Tuberculous Infection in Children.**—At the beginning of this work the, in some respects, new conception of the mode of development of tuberculosis now widely prevalent was referred to. Instead of considering it, as had been so long accepted and taught, a disease which attacked the individual at any period of life owing to influences inducing a run down condition or external causes, and which ran a mild or grave course in different cases, ending in recovery with more or less difficulty or passing into "consumption," the opinion now held is rather that bacillosis is a disease invading the child already in early life,

killing it in a hyperacute or subacute fashion, or aborting, or harassing it with various sorts of manifestations, interrupted by remissions of varying duration, and with more or less serious exacerbations.

Pulmonary tuberculosis itself represents but one of these manifestations, which may be recovered from for a certain period, then recur or become established as a chronic disturbance, ultimately destroying the individual, or else permitting him to live on for many years. Thus, it is a disease proceeding in separate stages, but beginning soon after birth.

In the midst of these stages, or better, these attacks, however, many of the patients recover, *i.e.*, once the attacks have run their course, they leave the subject either entirely or practically in the same condition that he was in before, and enjoying apparent good health.

While among the newborn or recently born, according to the absence or existing degree of inherited antituberculous immunization, some will be laid low by the infection, probably certain others will seem not to have become affected by it. The latter, unless they succumb to some other disorder, may later come to be considered as refractory to disease in general, including tuberculosis, as persons in a physical condition equal to any emergency and who are never ill. Between these two extremes, however, are comprised all the children in whom the tuberculous infection does cause trouble, who may recover permanently after an attack early or later in life, or even after several attacks occurring at prolonged intervals, and be restored to perfect health. In common medical parlance, these subjects are said not only to have had a sufficiency of inherited immunity, but also to have had this immunity reinforced by

each tuberculous attack they passed through and successfully withstood.

To be sure, these recoveries cannot be strictly said to be always recoveries from the standpoint of complete restoration of the involved tissues. They actually are, however, apparent clinical recoveries or recoveries substantiated by the lapse of time.

It is plain, then, that in whichever of the two ways the question is considered, the result is always the same as regards recovery from attacks of tuberculosis. Stress on the similarity of the two conceptions seems all the more justified when it is borne in mind that a given individual who has long since recovered from some tuberculous outbreak may perfectly well lose his congenital and even his acquired immunity, and become inoculated with the disease afresh. This simply brings us back to the former conception of the mode of development of the disorder.

**Sanatoriums for the Wealthy and the Poor.**—The earlier sanatoriums were established for the use of patients of wealth or at least of independent means. That such should be the case was only to be expected. The benefits from the treatment being striking, for many years no one thought of questioning the value of these institutions for persons able to remain there the length of time required for their recovery.

Later, as a result of the growing conceptions of social service, sanatorium care of tuberculous subjects devoid of means was undertaken. On all sides, in all countries, a laudable philanthropic campaign in favor of popular sanatoriums was initiated, and every large city sought to have its own institution of the kind.

Unhappily, the problem to be met was then no longer the same.

The wealthy or well-to-do consumptive could afford to be treated for months and years. The consumptive of the working classes could not. It was thought at first that by three or four months of rational treatment the worker might be restored to such a physical condition that he would be able to resume his occupation, and that society might find in the work of each unit thus restored to activity compensation for the expenditures it had been compelled to make.

In spite of all the financial schemes set on foot for the purpose, however, it was very soon seen that the sanatorium for workers, with treatment limited to a few months at the most, was little more than a delusion. Would-be smart people then proclaimed, of course, that the sanatorium was a failure. The public, in turn, included in the alleged failure the sanatoriums for patients of independent means. Such a conclusion was unfortunate, but nevertheless only human.

From the fact that the institutions for patients of the working classes did not and could not yield the expected results, unless the patients were kept much longer in order that they might be almost or quite cured, the conclusion was jumped at that sanatoriums in general were useless. One might as well say that in this world nothing is useful unless *all* are in a position to secure it.

As a matter of fact—and subsequent observation gave ample proof of it—the popular sanatorium or sanatorium for the poor yields the same benefits as the so-called pay sanatoriums provided the tuberculous subjects can be kept there for treatment a sufficient length of time. The terms of the problem had been improperly stated, that is all.

The utility of medical institutions for the treatment of tuberculosis is unquestionable.

It is in these institutions that patients who have made up their minds to seek treatment recover in largest numbers and in the least possible period of time.

It is in them that patients of slender means may learn within a few months how to take care of themselves, in order that they may subsequently complete their "cure" in independent fashion—a procedure only with great difficulty carried out when guidance is limited to the recommendations of a physician, however skilful he may be.

# PART III.

## Social Hygiene of the Tuberculous.

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### CHAPTER I.

#### SOCIAL HYGIENE.

By the term social hygiene is meant the precautions which the consumptive must take in order that, as a patient suffering from a transmissible disorder, he may avoid, in so far as is possible, making himself a permanent and ambulant focus of tuberculous infection toward his associates.

In this general chapter, a number of facts already mentioned in various preceding sections will necessarily be briefly referred to again.

Since no general restrictive regulations against consumptives as a class have been formulated, this duty of protecting the neighbor at present amounts simply to a moral obligation on the part of the patient himself.

Again, since society allows consumptives to be at large in spite of the known danger attending such a course, the right of the consumptive to be at large imposes upon him all the more the duty to protect his associates.

Formerly, cases of leprosy were banished and incarcerated. At present, strict regulations exist for isolating the earliest known cases of contagious disease, as reported by the physician to the authorities. And yet what are leprosy and cholera in comparison with tuberculosis? Fifty years ago, when cholera appeared in Paris, every one that

was able to go, fled. Yet all live tranquilly in contact with this far more terrible, permanent scourge, tuberculosis, which claims each year from the nation the flower of its youth.

Already fifty years have elapsed since the transmissibility of the disease was demonstrated beyond a doubt. Its immediate cause, the tubercle bacillus, has been known for thirty-five years. All this knowledge, however, has remained too much hidden in the scientific field. Physicians know it; learned societies have duly warned the public authorities; but education of the public in medical matters has made little progress.

Some families know all about it because one member of the family has developed tuberculosis and been directed to a sanatorium by the enlightened physician; and sanatorium life is a severe and wholesome object lesson which opens not only the patient's eyes but also those of all his relatives and friends whom he has had the courage to inform of the nature of his illness.

Sanatoriums are still so few, however—especially in France. Moreover, they are adapted chiefly to the needs of well-to-do patients. Thus, the facts with which all should be familiar remain unknown to the immense majority of the people. As a result, the public continues to succumb wantonly and meekly to tuberculosis, prey to a species of fatalism matched only by that of the Orientals. Before they die, the victims contribute toward the maintenance of an infected medium in which may become inoculated their parents, their friends, and others.

The reasons for this state of affairs—of which France, indeed, holds no monopoly—are not hard to find.

In the first place there is the idea of hopelessness always attached to this disease in the minds of the laity. Con-

sumption, phthisis, was ever held the irremediable affection. There was nothing to do but let the consumptive die, mitigating as well as one might his discomforts in the final stage. It was the inherited disease, which struck down all the children of a family, one after another. It was likewise, the interesting disease, written of by poets and romancers. Consumption, having the special property, highly advantageous for the individual but fatal for the community, of running its course often without much suffering and even in the midst of pleasant illusions of future recovery, was almost the desirable disease, dreamed of by young girls and young women who had lost all desire to live; and the event was looked upon as quite natural, and the young patients passed into the beyond in a species of halo. After the sister went the brother, then the rest of the family, and the fatal inherited taint was solemnly deplored.

At the present time, our knowledge of the subject is more satisfactory.

Inherited infection with the tubercle bacillus itself is so uncommon that it need scarcely be mentioned, and that which is really inherited from the parents is rather a kind of vaccination against tuberculosis, or antituberculous immunity. This immunity, however, is not absolute, but relative—sometimes of moderate degree, at others slight or absent; and if the parents have chanced to be in a temporarily or permanently weakened state of health at the time of procreation, the offspring inherits, besides, an impaired, feeble, poorly resistant constitution, offering a favorable soil for the development of the tubercle bacillus as well as to the germs of many other infectious diseases.

After these children have successfully weathered, by virtue of their inherited immunity of varying degree, the

early attacks of the tubercle bacillus and have recovered from these attacks, they are left in a variable condition of health and with an equally variable immunity. If they are then placed in wholesome surroundings, with less exposure to contamination, the chances are good that they will escape recurrences of the disease; but if, on the other hand, they are brought up on the premises, often contaminated, with their parents, they are very likely to relapse, either because their earlier attacks left them with recrudescent foci of disease, or because their recovery, albeit more or less perfect at the time, left them susceptible, through deficient immunity, to the external, permanent infection in the medium they inhabited.

From these facts it is readily seen that the apparent instances of true family inheritance are generally only instances of recurrence of the tuberculous attacks previously gone through in early and late childhood, or else instances of reinfection through familial exposure.

Thus a tuberculous father, escaping a fatal termination for fifteen or twenty years or more, may see his children succumb about him one after another—unless some fortunate circumstance has made it necessary for them to leave the house—and survive the holocaust, though being nursed himself for catarrh, chronic bronchitis, emphysema, asthma, shortness of breath, expectoration of thick sputum, etc.

In such a case the paternal, familial infection permeated the house, apartment, or room occupied by the tuberculous subject, in which his disease progressed, in which he died, in which everything was contaminated with more or less virulent or dormant tubercle bacilli.

Owing to the blissful ignorance of the entire family, no precautions were taken, and expectorated matter was

allowed to dry on the handkerchiefs, sheets, blankets, clothes, and all other articles used by the patient. The sputum, thus reduced to dust, adhered to everything in the apartment, and was inhaled by every one from morning till night and from night till morning. The relatives who took care of the patient and were in a condition to be reinoculated may thus have developed tuberculosis, some while he was still alive, others after his death. Indeed, until complete disinfection has been carried out, such a room continues a menace to all, and the house a dangerous dwelling-place, just as there were formerly dangerous pastures where any animals allowed to graze contracted anthrax because an animal dead of it had been buried there.

Again, there is the instance of the business office in which a tuberculous subject is employed. He coughs, but no one thinks anything of it; he expectorates anywhere—in his handkerchief, the dried contents of which he shakes in the faces of his associates, or on the floor, whence the dust is swept up next morning by the cleaner and distributed over all the office furniture. Subsequently one, and then another of the employes begin to cough, and there is no distinct reason why the epidemic should stop with these.

Elsewhere, it is a factory of some sort or other, and precisely the same sequence of events occurs.

These epidemic foci, which attract little attention because the epidemics are of a *chronic* nature, are all the more deadly owing to the lamentable hygienic conditions under which three-fourths of all consumptives are cared for. Authors have long been in the habit of describing the more or less comfortable or sordid quarters, according to financial circumstances, in which consumptives are kept, as though wrapped in cotton wool. Wholesome and curative air, the

real savior of the situation, is hunted down everywhere, and every effort made to prevent its entrance at any point.

Under these conditions one is led to wonder how it is that the persons in contact with the patient do not all contract the disease. The reason for this has already been explained.

Even when the source of the first case in one of these epidemics is not ascertained, an ample sufficiency of possible causes remains to account for it. Tuberculous infection exists everywhere about us, in the houses, in the streets, in public conveyances and railway cars. Everywhere some consumptive person has passed, infecting a particular neighborhood with his dried sputum. If in perfect health, we traverse the contaminated region with impunity; but if in a rundown state, we constitute the prey for which the tubercle bacilli have been waiting.

In view of the myriads of foci of infection about us, it seems unnecessary to seek an explanation of a given case of tuberculosis in direct inheritance from the parents.

It was only to be expected, before we were familiar with this frightful infection, that a fatal termination should be considered a definite attribute of phthisis, and that one should sink into a state of hopeless resignation and carelessness while living with a dearly held consumptive since there was nothing to do but conceal the nature of his illness from him and let him quietly die.

Now, however, since it has been conclusively shown, on the one hand, that consumptives do recover, and, on the other, that they constitute a menace to society, a different course must be pursued.

The physician, as soon as he has recognized the existence of tuberculosis in a given patient, must announce the fact to that patient provided the case is a curable one, since

this is the only way to keep him from being a menace to society.

Even granting that sanatoriums are few at the present time, and life there expensive, the problem is readily solved if the patient possesses some means.

If his case is one that can be cured or improved, he must be sent at once to a sanatorium, where he will find the conditions of individual and social hygiene indicated in his case.

If, on the other hand, he is unquestionably doomed to die, proper individual and family hygiene must be immediately instituted in his dwelling-place. For his own benefit everything that medical science and devotion can do to lighten his remaining span of life must be brought to bear.

For the sake of his family, there must be established about him hygienic surroundings in which all factors favoring transmission shall be removed or at least reduced to a minimum.

The room should be one receiving plenty of sunlight, easy to ventilate, and with a strict minimum of furniture and of hangings of all kinds. All material expectorated should be received in a table sputum cup, readily handled and cleaned, and the patient shown how to expectorate properly to avoid dissemination of sputum over his clothes and bed coverings. Spitting in a handkerchief must be absolutely forbidden. Morning and evening the sputum cup, always readily emptied if care has been taken to leave a little water in it constantly, should be simply evacuated into the toilet, destroyed by one of a number of well-known chemicals, or carefully burned in a hot fire.

If precautions against sputum dissemination are to be taken to the fullest extent, the following two measures must be resorted to:

In the first place, if the patient be a man wearing a mustache, he must have the greater part or all of it removed.

Secondly, *every time* he expectorates, he must wipe off his lips with a handkerchief and discard the latter, dropping it into a metallic box, preferably a large tin cracker box. He will thus be soiling 20, 40, or even more handkerchiefs, which should daily be boiled for fifteen minutes before they are sent to the laundry. Some dozens of plain handkerchiefs can always be readily secured for the purpose.

Granting that the sputum constitutes practically the only vehicle for the bacilli in pulmonary tuberculosis, the consumptive confined to bed or staying in a room can, under these conditions, be cared for and kept under observation by his relatives in complete safety. Yet it is well to exclude from the room persons with a weak constitution or undermined by a recent illness.

Sentimental considerations often render the physician's task rather difficult, but if at times his recommendations go unheeded, he should at least relieve himself of personal responsibility by giving fair warning of the disastrous consequences which may result from carelessness of the relatives in contact with the patient.

This family hygiene in tuberculosis cases must be maintained even after the patient's death.

The apartment he has been occupying, especially before due sanitary measures have been carried out, constitutes a focus of infection. Everything should be disinfected, carefully cleansed, done over, scraped, washed, cauterized, revarnished, recovered, etc. All in the way of bedclothing, cloth of various sorts, and hangings should be sent out for steam disinfection unless circumstances are such as to permit of their being exposed, turned over, and shaken out in direct sunlight for two or three days. Disinfected clothing

can be used again, but generally it is more convenient to have it destroyed. In any event, too much condemnation cannot be heaped upon the unconsciously culpable practice of making a present of the clothing to some unfortunate person, just as it came from the dead patient. For towels, underwear, etc., exposure to good soda suds is amply sufficient, as such a preparation boils only at a higher temperature than pure water, and boiling in water is in itself enough to kill the bacilli.

After all these measures have been carried out, it is further indispensable to leave the apartments for weeks with the windows wide open, both day and night if possible, and to allow direct sunlight to enter through all apertures, before the premises are again occupied.

House epidemics can be checked in this manner; no longer will whole families disappear from tuberculosis, as is still too frequent an occurrence, though a competent physician, called in time to see the first case of the series, could not only have frequently cured the patient, but at least have kept him from sowing death among his associates.

All that has just been said applies to families fairly well fixed financially. Among these the physician can accomplish almost anything if he is fortunate enough to be listened to and obeyed.

But what shall we say concerning the abode of the poor patient? Here, the physician, alone and dependent exclusively upon his own resources, can, as a rule, do practically nothing except deplore his helplessness. The dwellings of the poor! The agglomerations of filthy abodes with which our large cities are still encumbered. To drive out tuberculosis from these, air and light, if not direct sunlight, would have to be caused to enter. Their

inhabitants, moreover, would have to have wholesome food and plenty of it instead of alcohol, and the whole prophylaxis of tuberculosis is dependent upon these matters.

In 9 cases out of 10 the consumptive laborer exhausts himself without knowing it—though in some instances in full realization of the fact—to continue earning a living for his family, until the day comes when he goes to the hospital to die—unless certain common prejudices hinder him from seeking even this last, despairing assistance. No sanitary precautions are taken in his abode; it would be too expensive. He has not even the necessaries of life! He contaminates his dwelling, his furniture, and his clothing, too often infects his wife and children, and, if he succumbs before such infection has occurred, the latter takes place after his death. Then his wife, who has cared for him in the face of privations, is taken, too, to die in the hospital, and the children are cast on the street. Where the disease develops first in the wife, a similar course of events follows.

So much for these unfortunates. They have disappeared. But what of their former dwelling? It is rented at once to some other poor family. To be sure, among those overlooked by Dame Fortune there are some subjects, children as well as adults, who possess a high degree of immunity, and remain unharmed, at least for a time. But let an impaired physical condition be superadded—and its causes are many and perennial—the bacillus is there watching for its new victims, and the deadly sequence sets in afresh.

In the face of such catastrophes, what can the physician do? Nothing; absolutely nothing.

He prevails upon the unfortunate consumptive to go to the hospital. There, placed at rest, and fed gener-

ously with wholesome food, the patient begins to improve; he is kept for a month or two, then his bed is needed for a febrile case and his walking papers are handed to him. He now returns home, after having infected the hospital—to a less extent now than in the past, fortunately. Within a few weeks he squanders the vital energy he had recovered in the hospital, and soon returns there more seriously ill than before. Meanwhile he has again been infecting his lodgings, wife, and children. After a series of such admissions to and discharges from the hospital, he finally stays there for good, no longer possessing either the strength or the will power to return home to die.

Who is to blame? The unfortunate patient who has just succumbed? Or the physician who has had him in charge at home or in the hospital? Neither.

The blame rests higher up. As we have seen, society as a whole, though warned by men of science, has never done anything to arrest the onward tide of the disease. To society the blame attaches.

Private or semiofficial charity is here no less helpless than the physician working independently. Administrative measures can alone restrain the tuberculous invasion.

Regulations, often somewhat vexatious, have been officially established against diseases that are sometimes rather harmless, and the propagation of which the careful physician can generally cut short by simple, appropriate measures securing the object in view without bluster or disturbance.

Enormous sums are raised in order to make life pleasant for individuals whom society has cast out from its midst.

But nothing has been accomplished to save the lives of the thousands of unfortunates whose unremitting labor has

dragged them down to tuberculosis. Thousands of such cases arise each year, which should be cured.

Nothing has yet been accomplished to prevent these same unfortunates from transmitting the disease, during their illness and after their death, to thousands of others.

It would not be acceptable, of course, to impose ostracism or incarceration on the tuberculous, as has been done in the case of leprosy. Milder procedures are, however, available.

Tuberculosis being the great scourge of the human race, all the energies of social economy should be concentrated on one object, *viz.*, elimination of this disease.

For the diseased individual, sanatoriums should be at hand in which the curable cases could be treated until recovery.

For the case doomed to die at home, incurable, compulsory and free disinfection of the premises and their contents after the fatal termination must be availed of.

Finally, the physician called upon to treat such cases until they succumb should apply the known methods of checking the propagation of the disease. No patient will fail to heed his physician when he is told that in order to avoid transmitting the disease to his wife and children, all that is necessary for him to do is to collect every particle of his sputum. In this manner the physician may accomplish much.

Again, why should not the community supply gratuitously or at a nominal price instruments of public prophylaxis such as table and pocket sputum receptacles. Such a plan would constitute intelligent charity and would advantageously take the place of the time honored liter of wine of cinchona, which is useless.

Who will have the courage to start an open campaign for the use of the pocket sputum cup, backed up with all the power of modern publicity?

As for the consumptive occupied away from his home, in the school, in the factory, etc., the difficulties to be met are no less pronounced.

In the schools, the only practical measure would seem to be exclusion of the tuberculous pupil. If the case is a curable one and the family in good monetary circumstances, the child should be sent away for treatment; if the case is curable but the family poor, the community should take him in charge with the same end in view, *viz.*, cure of the case. Finally, if the child is doomed to succumb, it is useless for him to continue his schooling and before his death constitute for some time a focus of infection in the school.

In such cases, then, the child should be sent home to his family. Indeed, in educational institutions medical inspection should be such that this question of curable or incurable tuberculous pupils should never arise. Radical measures should be taken as soon as the first symptom suggesting active tuberculosis makes its appearance.

In the factories, circumstances are somewhat different, for there each worker is earning his living as well as that of his dependents. Exclusion of a diseased worker takes place automatically when the victim has lost his capacity for work. But until society is in a position to take charge of him at the outset of his illness and treat him gratuitously until he is cured, justification for an early ostracism of this sort would seem difficult to secure.

Since, however, the worker, through ignorance, neglect, or false economy, fails to consult the physician and drifts along until the disease is well-established and manifest to every one, why should not every factory be subject to medi-

cal inspection? Why should not the worker, as soon as he begins to cough, be at once compulsorily reported by the superintendent to a physician?

Why, as soon as the physician has made a diagnosis of tuberculosis, should not individual measures of hygiene be imposed upon the worker directly at the factory, thus enabling him to continue at his work without risk to his fellow operatives? Is it any less unpleasant to see discharging boils, cold abscesses, eczema, eye diseases, etc., exposed to the public gaze than to see some one carefully depositing his sputum in a cleanly and appropriate container? The worker's associates need not be at all inconvenienced by reason of his presence.

If society is not in a position to take charge of such a worker when he is curable and treat him willy-nilly until he has recovered; if the physician, left to his own resources, cannot cure him either on account of the poor hygienic conditions under which he lives, and if the consumptive dies, at least he will not have been allowed to disseminate the germs of his disease among his susceptible associates. And how many such persons, susceptible to tuberculosis, there are in factories!

Means are being sought to educate the public as to the dangers of tuberculosis. As a matter of fact, under the conditions mentioned this education would simply take care of itself. Gradually the coughers and spitters would find themselves morally compelled to cease expectorating on the floor and in their handkerchiefs. To be sure, such measures might at the start, as do all innovations, lead to unfavorable comment, but such comment would soon subside and education of the public concerning the danger from coughers be effected notwithstanding.

The same considerations apply and the same corrective measures are required in business offices. Here, however, the task is much easier. The higher standard of education of the office employees facilitates the institution of sanitary precautions. Obviously, if every diseased employee were warned and convinced of the danger to his associates attending his presence in the office, he would submit at once to the application of due prophylactic measures. Besides, either at their own expense or with some assistance from the employers, now often liberally and generously inclined, many office workers would find it feasible to go and obtain systematic treatment elsewhere.

Wherever individuals are grouped together there should be constant medical inspection, in order to detect the first case of pulmonary tuberculosis in any focus in which it appears.

In order not to be accused of demanding impossible things, I shall make no especial mention of the transmission of the disease on public highways. The streets belong to every one, some may object. To be sure, and likewise the precept that Peter's right leaves off where Paul's left begins should not be overlooked. Yet if the public were to any extent informed concerning tuberculosis, and if every person that coughed and expectorated on the sidewalk had some epithet "with a punch" hurled at him by any one he happened to meet, he would in many instances think twice before scattering his tubercle bacilli in the open beneath the feet of passers by.

Special ordinances have been issued forbidding expectoration in public conveyances. It seems much more cleanly to expectorate in one's handkerchief. The unfortunate feature, however, is that this handkerchief will later be recklessly shaken about in the faces of other passengers.

The reader need have no illusions as to the extent of the task to be accomplished in securing the various *desiderata* in tuberculosis prophylaxis, private and public.

So terrible a scourge cannot be obliterated at a single blow. But even if the task is portentous, or at first sight impossible, should no efforts be expended upon it? Should nothing be attempted because the whole thing cannot be done at one try?

To all progressive movements there is a beginning. In the first place, one should get rid of the fear of informing the public about what tuberculosis actually is and the risk to the community it entails. The daily press, so potent for good in many directions, could do much in this respect toward educating the laity. Once induced to start a movement in the proper direction by persons familiar with the facts it could unquestionably, itself, carry on the grand yet simple work of teaching the patients how to avoid transmitting the disease to others. How many apparently monstrous and inconvenient things the public could be brought to accept if it were simply prepared a little every day!

The laity could thus be taught not only that ordinary tuberculosis should nearly always be recovered from, but also that transmission of the disease can be readily prevented. As recoveries became more numerous, as each patient became less and less dangerous to his neighbors, the number of cases of tuberculosis would naturally decrease. Progress would be slow, but results as regards reduction of the disease could be definitely expected.

It is a regrettable fact that so far the attempts of the daily press have not, as a rule, kept the above mentioned aims in view.

Too often, in referring to the disease, the newspaper writer casts dismay among the lay readers, who finally get to look upon the unfortunate victim as if he had the plague; too often, instead of demonstrating to the working classes that their daily wages should be spent for good food and not in lounging from night till morning in taverns and other unwholesome places, they invite the public in high-sounding advertisements to spend their money buying pharmaceutic or other panaceas, which they try in succession without, as a rule, obtaining any benefit save the mental satisfaction of having used the "medicine" in vogue at the time.

The objection may be raised that perhaps we are on the eve of the discovery of a serum against tuberculosis. So be it. Let us hope most fondly that this important discovery will be made soon. But this is no reason for remaining idle while awaiting the desired remedy.

Further, it is not to be expected that the serum treatment of tuberculosis, if discovered in the near future, will annihilate the disease at one blow. Jenner's vaccine has already been available a century; yet regulations against small-pox are still being issued, and epidemics of the disease are still a possibility.

A little thought should likewise be given as to what this hoped-for antituberculous serum might be supposed to be. Theoretically it would prevent the tubercle bacilli from developing. Consequently one might expect it to be useful more especially in the acute forms of tuberculosis—those in which direct activity of the germ is the main feature. Such a result would in itself be highly gratifying, for up to the present time these acute forms have almost completely baffled medical science.

Will a subject with chronic tuberculosis and the attendant more or less deep-seated lesions be cured on the spot when his tubercle bacilli are killed with a serum? In all likelihood, no; for even when rid of these bacilli, he will still have his pulmonary lesions, and these lesions contain other germs, previously in league with the germs of tuberculosis.

A most important benefit will, of course, have been obtained, but the whole matter will not be settled at once. Moreover, until all consumptives have had their tubercle bacilli destroyed, they will continue to expectorate promiscuously and contaminate their fellow-citizens unless something is done to compel them to desist.

Thus, if hygienic measures against tuberculosis and the tuberculous were enforced, their value would by no means terminate if the prophylactic and curative vaccine should be discovered in the near future.

While we have been awaiting this happy event, the late war has lent impetus, especially in France, to a study of the question of public defence against tuberculosis. The authorities had their attention forcibly drawn to the serious problems brought up by the really alarming recrudescence of tuberculosis in the French Army, and firmly set themselves to face the attendant danger.

Manifestly, all resolutions and measures intended for permanent execution after the war have not as yet, with a few fortunate exceptions, been completely carried out. The impetus, however, has been given, propaganda is being started, plans for the defence against tuberculosis are being elaborated, and departmental commissions have been set up. The task of the latter is, from a lofty and comprehensive viewpoint, to set up suitable active units in the various districts, including dispensaries, sanatoriums, hospitals, and a

system of treatment and care directly in the homes. These institutions are already operative in a more or less complete form in some of the departments of France, and it is to be hoped that the few examples of them already in existence will be taken as models for the erection of similar institutions in all districts.

A word more may be said concerning the matter of conjugal hygiene in households where one partner in a married couple becomes tuberculous.

The married phthisical subject must sleep alone—alone in his bed and also, if possible, alone in the room.

The reason for this is not that bodily contact, or the patient's breath or perspiration, may prove very dangerous, as the laity believes. What really is dangerous to the patient's wife or husband is the dried, finely divided sputum which the least amount of splashing may project onto the sheets and bed covers.

Particularly should the patient sleep alone in his room because a single, entire room can never be too spacious for his needs, because it is inadvisable that another person should be using up one-half of the good air contained in it, and because even the patient's presence alone in the room is sufficient to poison the air with the products of his pulmonary exhalations.

If, however, the room is unusually large and the window left well open all night in accordance with the requirements already mentioned for carrying out the fresh air treatment at night, there can be little objection to allowing two persons to sleep in the same room, in different beds. I have frequently had opportunity to test this question out under the well ordered hygienic conditions in which my work is conducted.

The physician must, however, generally protest against having any children sleep in the same room with a patient.

Apropos of the matrimonial hygiene of consumptives, a final recommendation may be made to parents harboring tubercle bacilli. Let them restrain themselves, however difficult it may prove, in their outward expressions of affection for their children, *i.e.*, let them reduce kissing to a minimum.

## CHAPTER II.

### TUBERCULOSIS AND MARRIAGE.

THE circumstances under which it is permissible for a tuberculous subject who has recovered to marry have been referred to in a previous chapter. A definite rule was laid down to the effect that no patient who has not yet recovered has the right to get married.

His moral obligation in the premises is clear, and it would be better to say that it is his duty not even to think of the question of marriage. How often, nevertheless, as in the case of syphilitics, the physician, bound by professional secrecy, finds to his consternation a tuberculous patient marrying in spite of his express warnings against it!

In tuberculous cases much the same holds good as with syphilitics. It is freely recognized that the latter, well treated for a prolonged period—aside from the possibility of complete arrest of the disease by means of the newer remedies—long free of any manifestation of the infection, and in apparent good health, may contract a union with a good chance of having normal children. Yet nearly always the syphilitic, even when free of clinical signs, is none the less a carrier of the spirochetes.

In the case of consumptives, for as long a time as they are in a state of active disease and as long as their general condition indicates that they have not as yet gained the upper hand in their fight against the tubercle bacilli, they are in a situation similar to that of the syphilitic still exhibiting some form of specific manifestation, and under such conditions it is certainly not opportune for them to marry, for the following frequently emphasized reasons:

(1) In remaining single until further notice, they will have a much better chance of taking proper care of themselves and recovering.

(2) Upon marrying they expose their wives to a more intense tuberculous infection, if these wives are reinoculable.

(3) Upon marrying they run the risk of having children who will later become a prey to the disease.

(4) Upon marrying, if their wives, after having acquired tuberculosis, become pregnant, these women run the danger of developing the severe manifestations of the disease which attend delivery and the puerperal period in a large number of tuberculous subjects.

These are excellent reasons which, on general principles, should never be forgotten.

Were, however, tubercle bacillus carriers never to marry, who would marry at all, in view of what we know concerning the so-called latent, more or less dormant, and more or less recrudescent forms of tuberculosis? The essential point is to know under what definite conditions it is permissible for these persons to marry.

Such tuberculous persons may wed whose bacilli are no longer in activity, who have recovered from a pulmonary attack and exhibit all appearances of recovery, who never develop the slightest trace of fever and febrile reaction after unusual exercise, who do not show overstrain manifestations from trifles, and who, it must be expressly added, do not harbor any marked pulmonary lesions, even with the combination of favorable attributes just mentioned. These tuberculous subjects, full of vitality, knowing how to take care of themselves, and following a well understood hygienic régime, enjoy for an indefinite period an acquired immunity which will permit of their raising a family, as far as the tuberculous stigma is concerned, providing they

take care to maintain a satisfactory state of organic balance during the period of procreation. Naturally, after marriage they will have to continue to carry out the rational hygienic measures which, in most instances, have enabled them to recover.

So far, the matter seems a simple one. Conditions less readily dealt with, however, may be encountered, and not infrequently the physician's advice is sought under the following circumstances:

A young man harboring a moderately active tubercle bacillus infection, with pulmonary lesions and general condition such that he may with entire justification be considered curable, is engaged to be married. The fact that he is ill has not been concealed and has been accepted for good and all by his intended and her family, the whole situation being dominated by a duly considered state of affection for the patient. Should an attempt be made—on moral grounds, to be sure—to prevent such a marriage? To my mind, ***no,*** for reasons almost diametrically opposed to those already enumerated, *viz.,* that in such a marriage, contracted only after due consideration of existing circumstances, the patient will be much better taken care of than if he had remained single, and will have a much greater chance of recovery.

Being thoroughly aware of the nature of his illness and the hygienic measures required, he will be most careful not to neglect his customary treatment and will even compel his wife to adopt a safe line of conduct. Duly warned by his physician, he will await the opportune time for procreation, etc. Underlying the whole situation as a factor favoring proper execution of treatment and ultimate recovery will be a mental state which would have been wanting had the marriage not taken place.

That which seems proper and justifiable in the case of a single patient engaged to be married appears equally proper in the case of two tuberculous subjects under like conditions who wish to wed. I have not infrequently witnessed marriages between patients who had only recently recovered from a tuberculous attack, or who were merely in an apparent state of recovery, but who were expected, in view of their former diseased condition and existing state of health, to make a good ultimate recovery, and have in no instance had later to reproach myself for having allowed the marriage to be consummated.

Let it be mentioned again, however, that these marriages between tuberculous subjects are always contracted after due consideration of the attendant circumstances, with a calm mental attitude, and with a social status that insures success.

Aside from the cases just mentioned, the physician may likewise be consulted as regards a male or female tuberculous subject who is to marry in spite of the fact that the pulmonary lesions, grave *per se* as well as because of a concomitant poor general condition, have already removed all hope of recovery. The other party to the marriage is aware of the fact that she or he is soon to be left a widow or widower, but insists nevertheless on marrying the patient, for reasons which the physician, as an outside party, need not attempt to fathom. Manifestly, the latter should, on general principles, veto the procedure, warning the healthy party to the intended marriage of the seriousness of the patient's case. In such instances, however, the situation is generally so completely dominated by considerations of sentiment or other motives that the physician must expect to find himself contending in vain.

In the case of a young woman, the question of marriage is attended with even more serious possibilities. It is well established, indeed, that frequently pulmonary tuberculosis receives a most dangerous added impetus as a result of pregnancy and its sequelæ. Not infrequently, during gestation, tuberculosis remains concealed, provoking only very mild manifestations, or even sometimes coexisting with highly favorable and deceptive outward appearances, only to take a terrible revenge after delivery, following the clinical course described in the term "galloping consumption."

Hence the old-time rule—formulated, indeed, for a condition other than tuberculosis—to the effect that, among consumptives, the girls must not marry, the wives must not bear children, and the mothers must not nurse their offspring. This rule is of value in the sense that it calls attention to the risks encountered, but should not be taken as a general warning, as its universal application would not prove justifiable on analysis.

The danger is a real one, but is by no means constantly present. Every physician knows of instances—and these are not rare exceptions—of women with confirmed tuberculous disease who have gone through two, three, or four pregnancies, deliveries, and even lactations, and recovered. Doubtless, in spite of their high resisting powers, these women have sacrificed some small portion of their sum total of health in each of these undertakings, but none the less they have survived and may subsequently be restored to an eminently satisfactory physical state.

The causes of these variations in the risk attending pregnancy among consumptive women are not always easily traced. Reasoning by analogy, however, in comparison with what tuberculous subjects in general are capable of, the following line of argument may seem acceptable:

The tuberculous women who succumb in parturition through transformation of their disease into galloping consumption are those in whom activity of the pulmonary lesions has never been completely checked, or has even been continuously smouldering. Most of them are relatively recent cases, with an inherited or acquired immunity of less than average degree. They are abnormally sensitive to all forms of overexertion and to all endogenous intoxications, menstrual or other. Their vital equilibrium was imperfect even before the illness, and they were at a disadvantage throughout in the struggle against the tuberculous infection—not to mention the women all the more likely to yield during gestation because of some defect in their hearts, livers, kidneys, etc.

On the other hand, the tuberculous women who successfully withstand one or more pregnancies are not always women in seemingly excellent health—far from it. Generally they are women of a spare, muscular, or nervous type—frequently cases of long-standing tuberculosis that have more than once been seriously at grips with attacks of bacillary activity, from which they emerged triumphant with an added quantum of immunity or antituberculous vaccination; women who, harboring disease foci of varying extent, or even distinct cavity formation, maintain a surprising degree of nutritive balance, remain refractory to all stresses, and menstruate without any secondary harmful effect on their pulmonary disease; women, moreover, whose other functions are sound, even though they may have a mitral defect, but with unimpaired myocardium.

Upon establishing the above distinction, the terms of the problem are completely changed, just as when the question of allowing a patient with heart disease to marry arises.

From the medical standpoint and for the benefit of inquisitive natures that want to get to the bottom of things and attempt to account for these differences in the reaction of individual tuberculous women to pregnancy, the following suppositions may be offered:

That a woman with pulmonary disease generally passes through the nine months of pregnancy either in a moderately or a wholly satisfactory manner, or in an unexpectedly triumphant manner, with complete restoration of health, is due to the fact that her whole body and in particular her lungs are spared the indirectly harmful influence of menstrual intoxication for the entire nine months' period. It cannot be too often emphasized, indeed, that catamenial intoxication is the greatest enemy with which the tuberculous woman has to contend.

That the same woman, in the weeks following delivery, forbidden as she is in nine cases out of ten to nurse her child, on account of her lung condition, relapses into a severe form of tuberculosis, is accounted for by the fact that the period of lactation is replaced by the menstrual function during the six, eight, or ten months in which the woman should ordinarily have been nursing her child; the periods return and the menstrual intoxication overpowers her system at a single blow, striking the lung the hardest of all, and the system as a whole is placed in a condition of lowered resistance to the tubercle bacillus and the entire microbic flora accompanying it.

According to this line of reasoning, one is led to recognize the necessity of allowing maternal feeding of the infant in all instances in which pregnancy has been brought to a successful conclusion. To be sure, this is merely a general rule, and as in other matters, attendant circumstances must be given due weight in deciding upon the plan of action.

It is my belief that nursing of the infant should be ordered for the tuberculous woman who has gone through pregnancy successfully and has shown herself within a short period to be a presumably good nursing mother. Such a woman is subjected to the same management as the wet nurse, *viz.*, is simply allowed to proceed if lactation is satisfactory, but is stimulated at the proper time by the usual means if the mammary secretion falls below the necessary level. Needless to state, particular care should be taken to sustain such a mother in her nursing function by adequate hygienic measures. The longer lactation, even partial, can be kept up, the better for the patient.

In other women, who have successfully gone through pregnancy but appear pale when the lactation period is at hand, I again deem it advisable to sustain mammary secretion by all known rational measures and for the longest possible time, even were the suckling of the infant to have no other result than hinder drying up of the milk secretion.

In brief, what is especially to be guarded against in the two above types of cases is a suppression of lactation which would result in return of the menstrual function—an event to be delayed as long as possible. One should never purposefully forbid a woman to nurse her child on the ground that she is suffering from lung trouble.

Manifestly, in rather frequent instances the physician will find himself confronted with consumptive women who, in view of the extent of their lesions and of their general condition, should never have become pregnant; in such cases he must try to forestall a disastrous result as best he can.

## CHAPTER III.

### TUBERCULOSIS AND CHILD WELFARE.

It seems to be a fact that the chief factor governing the degree of resistance children are capable of offering to tuberculosis is the presence or absence of a congenital, inherited, ancestral state of immunity.

This inherited immunity appears all the more prominently and persistently the farther back the tuberculous inheritance may be traced among the antecedents. This applies in particular to certain families and races long since in a civilized state who have always lived in cities and been exposed throughout to an atmosphere of which the tubercle bacillus, constantly being reproduced, constantly eliminated by consumptives, and constantly disseminated everywhere, forms an integral part.

On the other hand, this inherited immunity is as a rule but slightly marked among individuals with only a recent tuberculous heredity, as is so often the case in remote country districts.

Congenital immunity is not generally present in equal degree in all the children of a given family. Aside from the offspring of different parents or of illicit unions, due account must be taken of a host of factors that may be operative at the time of conception, such as the age of the parents, their present condition as tuberculous subjects, the states of latency or activity prevailing in their pulmonary disease foci—*i.e.*, the condition of their own, individual immunity—their more or less impaired state of health due to other causes, such as intoxications of various kinds, especially alcoholism, of long standing or recent, drunkenness,

food poisoning, continuous or paroxysmal neuroticism, the major neuroses, the chronic or even at times the acute diseases, infections acquired before or since marriage, etc.

The progenitors transmit their antituberculous immunity to their offspring, adding to it a small or large portion of the various organic deficiencies with which they are burdened, and their individual immunity may have been markedly disturbed and of different intensity and quality at the successive periods of procreation. Accordingly, in a household of tuberculous subjects, among a given number of children all may enjoy a high degree of immunity, or none may possess any well-marked immunity, or some may succumb to acute tuberculosis at the very first attack, while others develop chronic, torpid forms of the disease.

Limiting our attention for the moment to the state of health of the parents as tuberculous subjects, it may be expected that from these parents there shall issue children modelled after their own condition, or rather, after the condition they happen to be in at the moment of conception. It may readily be supposed that the offspring will vary considerably both in general constitution and in inherited immunity according as one or both of the parents are consumptive, according as their disease foci are active at the time or in complete remission, etc.

Is this inherited immunity sufficient *per se* to keep the individual in a state of more or less effective defence throughout life; in other words, is there no other kind of immunity against tuberculosis?

The mere fact that this immunity exists is proof that it must have had a beginning, that it must have developed in a human subject before being inherited. The fact must have been, originally, that among the human beings attacked by tuberculosis, some were not killed by it and, acquiring in

this very manner a personal immunity, become the progenitors of an immunized group of individuals who, step by step, transmitted this defensive capacity to their descendants.

Now, what has been accomplished in remote periods can at any time be reproduced among subjects free of all inherited immunity. It must be recognized that there may occur an *acquired* immunity, obtained from the fact of living in a tuberculosis-laden environment.

An individual free of all ancestral immunity may, from causes as yet unknown, under certain conditions of aggression by the tubercle bacillus, *viz.*, of mild, repeated attacks which he victoriously withstands, acquire, from the very fact of engaging in this combat, a state of resistance that renders him refractory to the infection. Again, it is generally recognized that not all germs of the same species have the same degree of virulence or noxious power; this circumstance is in favor of the above-mentioned mode of acquiring immunity.

It is readily conceived, likewise, that an individual with some degree of inherited immunity may be enabled to maintain and reinforce this immunity from the very fact that, dwelling in tuberculous surroundings, he is receiving the benefit of the resulting acquired immunity.

Furthermore, when one considers the subjects with congenital immunity who are brought to grips early in life with the tubercle bacillus to such an extent as to develop some manifestation or other of tuberculosis, continuous or intermittent, in acute or subacute attacks separated by long intervals, whether these manifestations involve the skin, mucous membranes, lymphatics, serous surfaces, muscles, bones, or viscera—subjects, in short, whom the disease does not actually kill—may it not be that these persons have their immunity thus maintained at a high level, each period of

activity of the tubercle bacillus affording a new provision of specific resisting power? Are we not cognizant, along these lines, of the so-called beneficial serous pleurisies?

Finally, it is only logical to believe that many sluggish tuberculous foci, the lesions known as "local tuberculosis" some forty years ago, are themselves foci of immunity production—species of ductless glands which, according to the view of the existence of tuberculosis antitoxins, elaborate such substances and discharge them into the blood-stream.

All these modes of immunization contribute, then, to the formation of an *acquired* immunity—an actual *primary* immunity in an organism previously free of all intercourse with tuberculous disease, perhaps a *secondary* immunity in an organism that one may suppose to have lost its inherited immunity, and lastly, too, an *auxiliary* and *supporting* immunity in organisms whose inherited immunity is thought to have been insufficient from the start or to have become impaired later from internal or external causes.

Just as the parents are capable, according to their state of health at the time of procreation, of transferring to one of their offspring an almost complete and lasting immunity and to another an attenuated immunity or even an almost complete absence of immunity—the child in the latter case even losing the benefit of the ancestral immunity which it might have been expected to receive—so the child with an inherited tuberculous taint may, upon passing into external life, likewise lose all or part of his congenital immunity by reason of factors connected with this external life, uniformly factors causing profound disturbance of his organic equilibrium, such as faulty and inadequate diet, defective hygiene, various disease conditions, and later overstrain of various kinds, privations, physical and mental distress, intoxications, etc.

There exists no theoretical reason why this process of dwindling of the inherited immunity should not continue to the point of complete disappearance. The subject may then be considered to have been brought back to the condition of complete newness or inexperience with tuberculosis. A child may, for example, have resisted the earlier aggressions of the bacillus-laden environment in which he was born, or an older subject may have successfully withstood one or more tuberculous attacks and have become cured in so far as clinical examination is capable of demonstrating the fact; let these individuals then leave their former abodes and spend the rest of their lives in isolation, deep in the woods, far removed from any possible fresh infection. Will immunity in such subjects now disappear from the very fact that they are no longer under the necessity of maintaining it through daily combat against the germs? Without being able to answer this question definitely, we nevertheless feel it permissible to take up the problem of bacillary ***reinfection.***

Reinfection is to be thought of in subjects who have returned to a state of newness in relation to the infection, as above described, and especially, in any tuberculous subjects who are considered completely cured, yet, after a more or less prolonged interval, again develop tuberculosis. In such cases it seems not unreasonable to think of a reinfection, and for the moment it is difficult to prove that this is not actually the case. What practical conclusions may be drawn from the above considerations?

From the prophylactic standpoint it is clear that if all the offspring of tuberculous parents were to possess a well-marked immunity against tuberculosis, a great step forward would be made in the way of social restriction of the disease. Unfortunately it is well known that this congenital immunity is not always what it should or might be.

To render it effective and lasting in a large number of instances, moral education of the tuberculous parents would be necessary, such parents being instructed as to all the precautions to be taken that will enable them to procreate under such conditions of personal health as shall be most favorable for the transmission to the offspring of the immunity they themselves possess. This brings us into the vast domain of *eugenics.*

The instance of the tuberculous offspring does not, indeed, constitute a special instance of the application of this art or science—whichever one may choose to call it. Eugenics for tuberculous parents constitutes, rather, eugenics for the whole of humanity, since all or nearly all human subjects harbor a site of tubercle bacillus implantation or a focus of more or less active tuberculous disease. This is a fact which must be accepted, even at the expense of any ideas of pride.

Restricted and selected procreation would be the immediate object in the application of eugenics in this and other fields. A century ago, or even less, the problem was far more easily solved. There were doubtless as many bacillus carriers as there are today, but the number of children born was very great. The condition then existing may be said to have been an unreasoning process of *polygenics* which, as a matter of fact, was probably as effectual ultimately as the restricted eugenics now so much discussed. Among these "litters" of children there were, of course, according to the condition of the parents at the time of procreation, some that were strong and others that were unhealthy. The children, in growing up, were left, to some extent, dependent upon their own resources. Selection was thus rapidly effected. Out of 6 or 8 children, 2 or 3 died and were promptly replaced by others, the ultimate residuum being

4 or 5. These were the strong children—those to whom the parents had transmitted not only a serviceable degree of immunity against tuberculosis but also as few as possible of their various pathological taints.

Since then, while the number of children has been diminishing, the ratio of the strong to the weak has perhaps not greatly changed, nor the process of pathological selection either; but by the time the latter has completely run its course, not much remains. If, furthermore, the residuum were always of good quality, conditions would be better. But how often one is simply making strenuous endeavors to preserve from death, frequently for only a brief period, children really not fitted to live!

That the former prolificity will ever recur in the future is extremely doubtful—unless promiscuous procreation is permitted, with the offspring supported by the state. We have not yet come to this pass. In the meantime, and while looking forward to the possibility that eugenics may compensate for the polygenics of our forefathers, we must do the best we can with the material at our disposal.

The aim sought, then, is to preserve for the children any inherited immunity they may possess and if possible to cultivate and enhance it.

Shall there be finally discovered a natural or artificial product which, when introduced into a fresh human organism, will cause the elaboration of this same kind of immunity and which, furthermore, will be able to bring succor to the inherited immunity when the latter becomes exhausted through the lapse of time or appears to give way suddenly under the harmful effects of an unwholesome environment? To propound such a question is merely to formulate the hope that the desired answer to it shall come to pass.

Meanwhile the physician's task is to try to obtain by indirect means that which laboratory investigations have not succeeded in attaining directly.

In the first place, one should not endeavor to avoid contamination of the child by removing him from his customary surroundings and taking him to live in the woods, for this would eliminate for him the element of combat which must, in all likelihood, serve to keep up his immunity. The child may, however, be advantageously removed from unhygienic surroundings which lead to anemia, poison the system, and tend, if anything, to reduce such inherited immunity as he possesses; he may, if practicable, be placed amid more wholesome surroundings which will exert an opposite influence, *viz.*, tend to maintain the original immunity at its highest pitch by enhancing the functions of all the organs in the body.

This treatment by better air and plenty of light, together with all known adjuvants, is intended, then, rather to relieve any bodily shortcomings of the ordinary type which the subject may be suffering from than to obviate the tuberculous process itself, sudden development of which at any time so as to constitute a manifest illness is feared. Even less is it intended to forestall a supposed possibility that the child might become infected with the tubercle bacillus in the environment in which he had been born.

The aim to be sought is to conserve, maintain, and if possible exalt the inherited immunity which such children have possessed from the start.

No detailed discussion of the requirements in bringing up the newborn and young children until they are capable of satisfactory locomotion need here be presented. Everything possible should, of course, be done in order that they may pass successfully through the periods of lactation and

weaning. Yet it seems of value to emphasize the fact that these little ones should be allowed free latitude in their movements and not transformed into living mummies, clad in unyielding swaddling clothes; that they should be accustomed early in life, with due precautions, to sleeping in the open air; that they should be hardened to the contact of cold water through early subjection to affusions of progressively lowered temperature; that they should not be burdened with an excess of clothing, and that they should be trained as soon as possible to go about with their head, neck, arms, and legs bare. In a word, complete utilization should be made of all means appropriate for hardening them to external variations of temperature. As soon as the children, already partially trained by the above practices, have reached the age when they are able to run and withstand at least minor exertions, it will be easy to enhance further this state of hardening, which is the best means of maintaining robustness in persons already in a satisfactory condition of health and of rendering strong and vigorous those deficient in resisting powers.

In such instances physical training plays a useful rôle in promoting restoration to proper balance of all the organic functions. It also favors growth of the musculature, which one should always seek to develop rather than cause an increase of the body weight, adiposity never being an evidence of satisfactory health.

In connection with the exercise and physical training to which these children may be subjected, one should not, on the ground that rest is of prime importance in persons with active tuberculosis and that these children are the offspring of tuberculous parents and are very likely harboring tubercle bacilli themselves, follow the mistaken course of applying all the measures appropriate in the treatment of

active tuberculosis. Due distinctions should be made in this connection.

It may be taken for granted, without seeming exaggeration, that out of 100 children and adolescents considered free of any pulmonary involvement, having no fever, going to school or otherwise occupied or unoccupied, there will be found but ten apparently quite free of tuberculous infection, while in the other ninety the infection may readily be detected with the means of clinical examination now at our disposal.

Among these ninety about one-half will be at the time and will subsequently remain in possession of at least a relative, if not an absolute, immunity against development of the tuberculous process.

Are we, the physicians and children's parents, having observed that these subjects are of fairly satisfactory physique, more or less well developed, without any serious morbid taints, and quite ready to live, eat, and work, going to impede, on the pretext that they harbor tuberculous infection, their natural development by "spoiling" them, raising them amid childish precautions, keeping them shut up in a warm house lest they be exposed to cold, imposing upon them physical rest against which their very nature rebels, and reduce them to a state of atrophy through enforced inertia? By no means. In combination with the 10 per cent. of apparently untainted individuals, these 45 constitute the best stock from which the future generations are to issue. There is nought to be done but let them live and develop, taking care, however, to give warning that during their period of growth they must shun excesses of all kinds, in work as well as in play and exercise.

Early rising and retiring, physical training, and sports indulged in in moderation will make robust adolescents and

young men of most of them, and if to these wholesome habits are added measures calculated to harden the body to exposure through outdoor life and hydrotherapy—cold baths in particular—the chances that these young persons will escape any active manifestations of tuberculosis will be very good. If given wise counsel, and wise themselves in following it, it will be only natural for them to preserve their inborn immunity.

But as to the forty-five constituting the other half of the group, likewise definitely found to harbor tuberculous infection, likewise free of fever as a rule, but more delicate, less robust, and presenting stigmata which, either to the physician alone or to the laity in general, constitute outward evidence of tuberculous implantation or of an actual slow, gradual, insidious invasion of their systems by the specific germ, are we again, on the pretext that they harbor the bacillus, either to condemn them to immobility or to let them live according to their own devices, like the preceding group? No. Neither of these plans is serviceable.

They must not be immobilized on general principles because to impose such immobilization would be to take away from them factors necessary in keeping up their struggle for existence. Nor should they be permitted very great liberty of movement, because in these individuals the limit separating wholesome activity from excess is soon overstepped, and overstrain, physical or mental, is always imminent.

Under these circumstances the physician—formerly the family physician—has an important rôle to fulfill both as regards the children themselves and their parents. These rather delicate persons are generally brought up "in cotton" in order that they may ostensibly be kept protected from exposure to cold and the inclemencies of the weather, and as

their physical constitution is rather unsatisfactory, special and strenuous attention is paid to developing their minds. The physician must react against this perpetual coddling and, indeed, insist that the usual practices in the matter be reversed. The mind must in these cases give way to the needs of the body.

The subject should be gradually hardened to the open air and inclement weather by outdoor life both by day and night, by the progressive discarding of superfluous articles of clothing, by stimulation of the skin functions by means of rubbing, cold affusions, the cold tub in the morning, cold baths, and swimming in fresh water.

If the subject's mental pursuits are actually pushed far beyond the average, his studies should be suspended for a time. Such a radical step is far preferable to any half-way measure which serves only to potspone the difficulty. The child should be given much freedom and remain as much as possible out of doors, leaving the shelter of the house in any sort of weather. Exercise in the form of walking, games, and running should, to be sure, be somewhat restricted lest there occur overstrain, the early symptoms of which, however, are readily detected. Plainly, the best course of all would be to put the child out in the fields, perchance with a cow or goat to look after. Such a procedure, to be sure, is not always feasible.

The aim to be sought is to develop in these young subjects a degree of resisting power which will double the moderate amount of immunity they originally possessed and improve their condition to correspond to that of the preceding group. One succeeds in attaining this object in the great majority of instances, although in many cases it is necessary to combat all manner of prejudices and sentimentalities.

In this group of young subjects there are many who present a notably deficient condition of the thorax, the chest being either of unusually small size or presenting the characteristic deformities which so frequently attend late rickets. Often the thoracic insufficiency in these children can be readily corrected, at least in large part, by means of breathing exercises, either alone or combined with appropriate gymnastic muscle training. Like considerations apply in beginning curvature of the spinal column. Sleeping on a hard bed; suspension on the trapeze or rings with or without progression; exercises involving flexion and extension of the lower limbs on the trunk and *vice versa,* the child lying on the floor or on a ladder placed at an angle of 45 degrees and gripping one of the upper rungs with his hands extended above his head—all these are simple and very frequently sufficient measures for overcoming such incipient deformities.

The greatest source of trouble in that period of life, however, is obstruction of the nasal passages, generally due to hypertrophy of the mucous membranes of these passages. This condition produces two harmful results. In the first place, nasal obstruction interferes with natural performance of the act of breathing and puts an obstacle in the way of proper development of the thoracic cage and lungs. Again, there is permanent infection of the nasopharynx, which extends to the mouth—the latter being closed neither by day nor by night—and operates as a permanent threat of microbic involvement in the lung apexes in these children, who are always carriers of implanted tuberculous infection; as a result there occur colds in the head, inflammatory conditions of the eyes and ears, enlarged glands, tonsillitis, chains of glandular masses at the sides of the neck, etc. There is therefore great need of prompt and vigorous medi-

cal and surgical treatment of the abnormal condition in the nasal passages, which in nine cases out of ten is at the bottom of all these disturbances. No reliance should be placed on the pernicious dictum that such disturbances will pass off of their own accord when the subject is about 18 years of age, for meanwhile ample opportunity will be given for the child to become deaf and acquire permanent chest involvement, if, indeed, he does not succumb to tuberculosis before reaching the eighteenth year.

To assist the children in successfully passing through these critical stages in their development and growth, not a few so-called "tonic" remedies are available. Such medication is time-honored and widely—often too widely—approved of by the laity, who make excessive or inopportune use of such preparations independently of the physician's advice. What is especially to be recommended, however, is climatic and thermal treatment.

In nine instances out of ten, these candidates for tuberculosis, or persons harboring a torpid tuberculous infection, do well at the seashore. There is therefore a wide choice of resorts to which they may be sent.

At least as serviceable, if not indeed more so, is a stay at some mountain resort. Such resorts are, of course, situated at various elevations, and the particular elevation sought is selected more through individual fancy and the general vogue at the time than for any other definite reason. It is quite useless to insist upon an elevation greater than 1000 meters (3175 feet). In France the Pyrenees, the Central Plateau, and the Alps offer as wide a range of elevations and climates as may well be desired.

For the children referred to, saline, sulphurous, and arsenical waters are very serviceable, and in accordance with special indications existing in the individual case they may

be sent to one of the various thermal resorts having the desired properties. In France, however, there is no question as to the superiority of the thermal cure at La Bourboule for this class of patients. This particular resort affords three therapeutic factors of high importance, *viz.*, the arsenical waters, appropriate in nine out of ten cases; the highly stimulating air cure at a sufficient elevation, and the exercise cure in a mountainous country. Turned loose outdoors for a large portion of the day, the children indulge spontaneously in general motor and especially respiratory activity which is, as a rule, worth any amount of artificial training. In two or three months, and frequently in an even shorter time, they are literally transformed, not only as regards general body tone and manifest vitality, but likewise as regards functional capacity of all the internal organs. Soon they are in so satisfactory a state of health that they may be classed along with the first group of 45 subjects above referred to.

Many resorts afford the air cure and the mountain exercise cure, and likewise yield good results, but lack the arsenical cure.

To be sure, not all the tainted subjects under consideration show such a complete change for the better as a result of the treatment. One must expect a few to remain in a stationary condition, unable to reverse the unfavorable trend, and at some future time destined to become cases of active tuberculosis. There are some who continue to alternate between apyrexia and fever. When thus tested out, their true condition soon comes to light, for as soon as they indulge in what constitutes for them an excess of exercise they exhibit more or less evanescent evidences of a febrile movement, such as unusual animation of the face, soon accompanied by a fatigued appearance with dark rings

about the eyes. The thermometer shows that, at least in the afternoon, between four and six o'clock, their temperature is too high. These are already no longer afebrile cases, and it is important to detect them as such, for if exercise is not dispensed to them under special limitations, and if the necessary amount of rest is not imposed at definite hours, their condition can hardly be expected to do anything but grow worse under the influence of the continuous "overstrain" to which they are exposed. They thereupon pass into the group of tuberculous cases who lose their inborn immunity and require to be subjected to the systematic treatment for active tuberculous disease.

If the same plan is followed in all the other instances; if, after having successfully passed through the danger period of early development, they are further taught the principles of rational hygiene, sobriety, and an aversion to all excesses; if they learn to parallel mental occupation with physical exercise never pushed to actual overstrain, there will be many chances for them to develop into healthy men.

Needless to state, what has just been said applies as well to girls as to boys, and sufficient reference has already been made to the critical period in their development to make further allusions superfluous.

## CHAPTER IV.

### PHTHISIOPHOBIA AND PHTHISIOMANIA.

PHTHISIOPHOBIA came naturally into being by reason of the deeper knowledge of pulmonary tuberculosis on the part of the physician and more widespread knowledge by the public in the last thirty years. On the one hand, indeed, the compassionate heedlessness with which consumptives were formerly treated, when little or nothing was known of the transmissibility of the disease, has given place to more intelligent and vigilant care of the patient, better supported by confidence in the possibility of ultimate recovery; on the other hand, increased knowledge has awakened in not a few individuals an abject terror of transmission of the infection. This has, indeed, been the case in the histories of all diseases reputed to be transmissible.

The fear of tuberculosis is manifested in a wide variety of ways.

**Collective Phthisiophobia.**—In the first place there is the form of phthisiophobia which affects large groups of persons. This is, in general, the influence which puts obstacles in the way of the erection of many important health institutions on the ground that every one dwelling in the neighborhood of these antituberculous institutions will contract tuberculosis. Difficulties of this sort are commonly encountered, in all countries, whenever plans are on foot to erect an institution for the care of pulmonary cases —unless the site chosen be in a remote, uninhabited locality. The same influence asserts itself, where local interests are threatened, in bringing about a paradoxical situation which

all are aware of but against which no individual protests openly, *viz.*, that in which, in thermal spring resorts, where practically no one except consumptives go, it is tacitly agreed and understood that there are no consumptives and that there must not be any. One unfortunate result of this state of affairs is that when guests leave the resort, no disinfection of any sort is practised on the ground that, these persons not being tuberculous, it would be useless to carry out such disinfection. On the other hand, if the visitors, all actually tuberculous subjects, knew that there were consumptives at the resort and that systematic disinfection was being carried out, few would go there at all. The whole situation hangs upon a question of etiquette as regards the disease, and the patients themselves are lulled, pleasantly if not harmlessly, into a state of complete psychic satisfaction.

The same paradoxical condition sometimes accounts for the exclusion from a hotel or boarding house of a frank and open tuberculous patient who, in the middle of his meal, naively takes out his pocket sputum receptacle and expectorates into it in a cleanly manner while all other persons at the table simply expectorate their tubercle bacilli into their handkerchiefs.

What distressing as well as laughable instances of these phobias, actual or arising simply from self-interest, might be cited!

**Familial Phthisiophobia.**—This variety is less of a source of amusement, for too often it rises to such heights as to become cruel or even criminal.

Fortunately there are many families in which the tuberculous relative is cared for with much devotion, whether the hygienic measures taken be good or bad. But in how many homes, too, the opposite condition prevails!

In one house, for example, a paid guardian is more or less brutally installed to take care of the patient from the very day that his illness has been definitely diagnosed as tuberculosis; the other members of the family prudently beat a retreat and thereafter appear in the room only on rare occasions, keeping a respectful distance away from the bed, inquiring as to his condition from across the room, etc.

In another instance the mother gets rid of her tuberculous child, taking him promptly to some institution, watching the preparations for his installation, but keeping a certain distance from the patient, near the open door or window, with gloves on, face veiled, and decamping as soon as possible, as if the building were on fire.

Again, a father brings his son to consult a physician, enters the latter's office, but goes no farther into the establishment and, having brought the patient to his destination, hurries out to catch a train back home.

Another example is that of a woman who tries for months on end to get her tuberculous husband settled somewhere else, not with a view to his receiving better treatment, but in order to rid the premises of his presence, even though the otherwise commonly heard excuse, that there are young children in the family, is not available in her case.

All such conditions, aside from many other difficulties that have to be met in these cases, are deplorable, hard on the patients themselves, and distressing through the unfavorable light they cast upon human nature.

But even more unfortunate episodes occur. In spite of the present common knowledge of tuberculous infection and phthisis, which is now so widely diffused that these terms and that which they represent are no longer misunderstood, there are still parents who refuse to believe that their children have tuberculosis. There has never been a case in the

family, they state; that the child has tuberculosis cannot and must not be true, and the physician who insists that the condition present is actually tuberculosis must be grossly in error. I have seen some of these parents who refused to accept the situation even after having been shown all tangible proofs of the correctness of the diagnosis; in consequence, their son not being tuberculous, the tuberculous condition was not treated and the child died. And to cap the climax in these bitter experiences, when an inquiry is made into the past medical history of these same parents too often one or both of them are found to be long-standing cases of tuberculosis, who have been living for twenty or thirty years on good terms with their tubercle bacilli and old fibrous lesions, but meanwhile been flooding the premises with their so-called "catarrhal" expectoration; or, the mother may be found to have gone through a severe and prolonged attack of anemia at the age of 16 or 18, and been advised at that time by a competent physician to go to the country and recuperate on rest and overfeeding.

The causes of this culpable species of ostracism are to be sought sometimes in fear of contracting the disease recently diagnosed, fear for the relatives and for the other children and members of the family, and sometimes in the fancy that the announcement of the existence of tuberculosis in the house will constitute an obstacle in the way of all pet projects, all hopes of social advancement, and especially all subsequent matrimonial arrangements. But besides there is a horror of the tuberculous taint thereafter hanging over the family, in which up to that time no instance of lung trouble had been known to occur. Perhaps it is this species of superstitious terror which underlies the most severe and inhuman sentiments and acts sometimes met with under such circumstances.

**Individual Phthisiophobia.**—Phthisiophobia of the family type is not infrequently supplemented by individual, or better *personal,* phthisiophobia. The latter reaches its utmost height, however, when manifested apart from all familial sentiment, and then becomes actually a phthisiophobia of the *egotistical* type.

(1) The phthisiophobic person of this type thinks of nothing but the preservation of his own skin; to all other duties and difficulties he remains absolutely unresponsive.

One person, for example, is in particular terror of the word tuberculosis.. He will never visit any one in a sanatorium because he would see consumptives there, and all arguments to prove the high degree of safety attending such a visit fail to alter his mind. On the other hand, he will cheerfully frequent resorts populated almost entirely with consumptives being treated for catarrh, emphysema, asthma, and chronic bronchitis, after the departure of whom little or no trouble is taken to disinfect the premises. Further, he never takes pains to inquire who has been occupying before him a closed carriage, taxi, railway compartment, or hotel bed.

Needless to state, he will not under any consideration visit friends or relatives in whose house there is an avowed case of tuberculosis. In fact, I was acquainted with one who never went to a funeral without having inquired into the cause of the deceased person's death.

Another individual may be afraid of everything about him because any object might have been contaminated by contact with a consumptive. When touching any object, he does so in fear and trembling. At the table he insists upon having separate utensils for his own use. He hesitates to wipe his mouth with a napkin. He has a childish dread of using the telephone, never takes hold of the banisters when

going upstairs, and wears gloves all the time. Whenever away from his own house he avoids touching anything; if, in spite of himself, he has touched something he is seized with an imperative desire to go home and disinfect his hands. His phobia has become such that he is practically a maniac.

(2) The most surprising of these types, however, is that of the person who, himself a tuberculous patient, gradually falls prey to the same dread of contact with tuberculous material and becomes addicted to equally ridiculous practices.

Such a patient likewise refuses to enter a sanatorium because he might be treated in conjunction with other patients *more severely ill than himself* who might infect him. Or, if he does enter such an institution, he believes himself at the mercy of all the forms of contagion he has ever heard of. He is constantly washing his hands, and burns his skin in using various alcoholic preparations and carbolic solutions.

Not a few French consumptives, before going to a sanatorium, make sure that they will have a correspondent in a foreign country and have their mail pass through London or Geneva, lest the knowledge of their being in a health institution should prejudice their future prospects.

(3) There is another group of consumptives who, while dreading superadded infection from another patient, are also in fear of infecting themselves, obviously through the medium of their own sputum. There need be no apprehension that such a patient will expectorate into his handkerchief; he uses the required sputum receptacles, but whenever doing so, takes infinite precautions and puts down the receptacle with respectful care, immediately washing his hands with some form of antiseptic fluid thereafter. If he

thinks he has scattered any of the sputum on his clothing, he at once rubs an antiseptic preparation over the suspected area.

A more frequently encountered phobia is that characterized by the fear of swallowing sputum. Having learned that such a practice might bring on tuberculosis of the intestine, the patient not only takes special care to eliminate completely his pulmonary discharges, but also, in the absence of all need of expectorating, makes desperate efforts to expel all the saliva and mucus secreted in his mouth and pharynx. He expectorates every few moments and each day fills a number of sputum receptacles with clear saliva covered with a persistent frothy layer. This is actually a species of maniacal ptyalism, necessarily entailing sialorrhea, which in turn soon proves harmful by reason of the amount of saliva expectorated. Patients of this type, though suffering from a condition diametrically opposite to sialophagia, readily become aerophagic, *i.e.*, swallow air. When these two habits become simultaneously established, a definite complication is added to the patient's original disorder, for he has difficulty in taking food, and besides, loses a considerable amount of saliva each day.

(4) In opposition to the above group of phthisiophobic patients of the egotistical type, there is likewise a group comprising those who may be labelled *altruistic*. These patients are not apprehensive as to their own safety, but are obsessed with the idea that they are a constant menace to other persons. They anxiously follow with their eyes the physician or nurse who picks up the sputum receptacle to examine its contents. They rub twenty or thirty times a day with a tampon dipped in an antiseptic solution some spot on their clothing which they think they have contaminated with sputum while expectorating. They likewise

rub their fingers, their hands, and sometimes their faces, because of the thought that they may have scattered a few particles of bacillus-laden sputum upon these parts during a coughing paroxysm, and fear to transmit infection in case they are later called upon to shake hands with or be kissed by a relative. They indulge in veritable debauches of antiseptic fluids, sometimes too concentrated, and causing actual burns on their skin.

Needless to state such patients are enthusiasts regarding cleanliness of all utensils they employ, such as table-ware, toilet articles, books, papers, etc. They are constantly engaged in the process of cleaning things with which they come in contact. One patient I knew, after opening a door, never failed to wipe off the doorknob with his handkerchief moistened with alcohol, a small bottle of which he carried about with him in his pocket. Another rubbed the floor with an antiseptic compress at all points he thought he had soiled with particles of sputum.

Manifestly, phthisiophobia pushed to such a degree of egotism or of altruism depends for its existence upon a special neurotic state of the patient. It seems highly probable that if such maniacs had not become phthisiophobic, they would have been fit subjects for phobias of other kinds under the influence of some different disease. Unfortunately, an endless variety of puzzling mental disturbances is encountered among the tuberculous; and this is not surprising for, like certain other diseases of potentially prolonged duration, tuberculosis reacts upon the human system even to its deepest parts, and brings out into greatest possible relief all the congenital or acquired taints of which the individual has become the subject.

**Phthisiomania.**—In confirmation of the above generally recognized medical truth, it will not be irrelevant to say a

few words concerning phthisiomaniacs—persons suffering from an aberration derived from phthisiophobia. These cases are met with rather frequently among the tuberculous, but also occur in certain individuals who have not been put down as actual, clinical consumptives.

(1) The last category of persons form a group apart. They are generally subjects who, after having been in contact with a consumptive for a considerable period, are seized with certain symptoms which lead them to believe that they are themselves developing tuberculosis, until finally the physician definitely asserts before them that there exists no tuberculous process in their lungs. Even such an assertion, however well supported by clinical observation, is not always sufficient to drive out the idea of tuberculous infection from their minds. Plainly, these are always neurotic individuals of a particular type who, having been witness to the successive stages of the disease as it ran its course in their patient, relative or friend, unconsciously analyzed and elaborated in their minds all the primary manifestations of the disease—the most striking ones, naturally—and gradually, either through abject fear of the disease or in the absence of such a phobia, reproduced by imitation one or more of the usual manifestations of tuberculosis.

The most frequently imitated manifestation is, as is well known, hemoptysis. I knew one young lady who, after having taken care for a long time of an ultimately fatal case in a relative, lived for several months a prey to pseudo-pulmonary hemorrhages which recurred every morning and also in the course of the day. This patient consulted a large number of physicians, who found it impossible to disabuse her of the idea that she was a consumptive. Though rather thin, she continued in a satisfactory state of health, and without in the least becoming anemic on account of

her blood losses. What she expectorated every morning came simply from her palatopharyngeal arch, the mucous membrane of which she *expressed* by a special sort of muscular contraction or suction. Similar cases have been recorded relating to women who drew from the pharyngo-esophageal region the blood eliminated in their alleged hemoptyses.

Many other symptoms may be imitated, aside from the loss of weight manifestly due to the constant state of anxiety and the anorexia which nearly always follows, *viz.*, cough in particular; expectoration, with expulsion of material consisting merely of nasopharyngeal mucous discharges or saliva alone; night sweats; hoarseness due to laryngitis; pain in the shoulders; localized pain between the scapulæ; and even abnormal temperature of the body—occurring, however, at "fancy" hours of the day and with enormous variations within the space of an hour or even less, as in the so-called "nervous" fevers.

As a rule, the various little unconsciously developed schemes of these tuberculosis fakers are readily detected, but to cure them of their habit of mimicry is not always as easy.

(2) In another category are the actual consumptives who, after having recovered, or at least apparently recovered, *refuse to be well* and continue, in spite of all opposition, to take equally as great or even more thorough care of themselves than they had during their period of active tuberculosis.

Some, because of their phobia of an aggressive recurrence of the disease, maintain their body weight at an enormously high level and by intensive rest and sustained overeating, inflict upon themselves an actually prejudicial obesity, which overburdens their heart, causes sensations of

oppression, and leads them increasingly to the belief that their lung affection is returning. Accordingly they are much astonished and even thrown into consternation when told that their actual disease is general obesity and warned that to recover they must eat less and get accustomed to walking.

Others harbor a fixed idea of uncured tuberculosis because they expectorate more or less every morning and even in the course of the day, mistaking their sputa of naso-pharyngeal mucus for discharges from the lungs. These persons are much surprised when cured by systematic treatment of the nose and throat.

Others, again, are hypnotized by their alleged tuberculous laryngitis, which consists merely of a variable, intermittent hoarseness, such as not a few consumptives who have had laryngeal catarrh during their illness continue to exhibit after recovery. This so-called laryngitis can frequently be caused to disappear by insisting that the patients exercise their voices.

Others still are always thinking they are tuberculous because they experience peculiar sensations in their shoulders or in their backs between the shoulders. These subjects generally become devotees to all sorts of counterirritants, tincture of iodine, mustard plasters, poultices, all used in alternation with vigorous cauterization and dry cups which they have regularly applied every morning and evening. Actually one finds it a displeasing task to get them out of this innocent habit, for they are made really unhappy when their delusions are destroyed, one by one. When finally convinced of the true state of affairs, however, they generally look upon the whole matter as a good joke at their own expense.

Others, finally, are continuously engaged in a sort of a conversation with their stomach, their intestine, or their abdomen "en bloc," having become convinced that they have tuberculosis of the bowel. These are nearly always simple aerophagics or subjects suffering from dilated stomach or constipation. All these pseudotuberculous patients—their tuberculous lesions having actually ceased activity long before—are naturally on the hunt for the healing panacea appropriate in the treatment of their individual conditions, and which they never find. Some move to different climates at definite dates several times in each year; others are constantly on the lookout for new drug preparations, try out all the therapeutic methods which successively come into vogue, or seek to have a Forlanini artificial pneumothorax practised upon them.

Among all these maniacs of tuberculosis there are naturally some who recover, either quickly, when some fine day they are finally convinced by some physician or other of the absurdity of their obsession, or slowly and gradually, after the lapse of years, through a species of exhaustion in the struggle they had been keeping up, through a return to more sane ideas concerning their state of health. I have known some, however, who continued victims of this maniacal phthisiophobia, as a residual manifestation of their former tuberculous illness, throughout their lives or for a period of ten or fifteen years. These individuals not only kept up the strict hygienic measures which they had practised while ill—a procedure which could not but prove serviceable—but also continued various assorted treatments and "cures." Most of them, as a matter of fact, were none the worse for their peculiar habits, but were nevertheless greatly at fault in making intolerable nuisances of themselves in their families.

**Tuberculosis Malingerers.**—The phthisiomaniacs who involuntarily mimic the symptoms of tuberculosis with which they have been most deeply impressed must not be confused with the tuberculosis simulators or malingerers, who mimic the disease on purpose. In a general way these individuals may be classified in two groups, according to sex.

On the one hand there are the young girls and young women who, from the well known motives for deception, to make themselves interesting, to excite sympathy in their parents or friends, or simply to "fool" people, so behave as to produce, generally in a rather awkward fashion, an apparent state of illness which might possibly deceive their relatives but the fallacy of which is at once evident upon medical examination.

On the other hand there are the men who, in order to be excused from their occupational obligations or military duties, try to counterfeit pulmonary disease like others simulate more or less unacceptable physical defects.

Finally, of late there have appeared instances of tuberculous sinistrosis, precisely resembling the condition of sinistrosis following occupational accidents.

**Therapeutic Indications.**—Descriptions of the therapeutic indications in phthisiophobia cannot but be rather simple—which does not mean, however, that treatment is an easy matter where phthisiophobia is already well established. Indeed, its beginnings, as in any other variety of phobia, date back to a rather remote period, and one cannot expect to eradicate it in a few days by judicious explanations coupled with more or less rational medication. Favorable results are obtained only by dint of patience and with the lapse of time.

Prophylactic treatment, indeed, would be more appropriate, and aside from the varying degrees of predisposition

to phobia existing in different persons, it would be necessary to disseminate among the laity somewhat less terrifying and more wholesome notions regarding tuberculosis, its clinical course, and the degree of its transmissibility. To my mind the following is what the public should be taught, to wit:

That the question of tuberculosis or phthisis is dominated by the conception of a congenital and acquired immunity against the disease; that our parents and ancestors transmit to us, not actual tuberculosis, but rather a variable degree of immunity against it.

That in our early childhood, in the bacillus-laden medium into which we are thrown, tubercle bacilli become implanted in all of us; that, in accordance with the amount of inherited immunity they possess, some continue harboring the germ in a latent condition, without being aware that it is in them, for years and even up to adult life; others promptly succumb to the acute or hyperacute, infectious forms of the disease; the larger number, on the contrary, reflect the presence of the germ by disease manifestations in early or late childhood, such as repeated bronchitis, glandular enlargements, chronic nasopharyngitis, intranasal vegetations, pleurisy, and later, disorders of the growing period in both sexes, severe anemia, pallor, chlorosis in young girls, not to mention the actual attacks of pulmonary disease, and the so-called typhobacillosis—the latter being apparently to infectious bacillosis what varioloid is to small-pox—all these occurring in the adolescent and on up to adult life.

That those who more or less successfully withstand these attacks, whether the latter occur at intervals or overlap, seem each time to gain therefrom an increment of immunity which becomes added to their congenital immunity.

That in nine cases out of ten these attacks, which very frequently appear as if they marked the onset of consumption, are merely reawakenings or returns to activity of the tubercle bacillus infection which had remained latent or overlooked since infancy; that consequently, in a general way, when there burst forth in an individual the bacillary activities constituting pulmonary phthisis, that individual has been harboring within him the conditions necessary for fresh activity of the disease, and that in most instances there is no need of ascribing the development of tuberculosis in given individuals to acquisition of the infection from some other person.

That it is highly probable, furthermore, that a person suffering from active tuberculosis is protected from fresh infection, *i.e.*, that the tubercle bacilli of other individuals do not obtain any foothold in his system.

That persons who have remained in a condition of good organic balance and retained their inherited immunity, perhaps reinforced by acquired immunity, possess good chances of escaping from these returns to activity of the tuberculous process; that, on the other hand, those who, after having possessed a high degree of congenital immunity, have lost it after the lapse of some years from well-known causes, or those who, after having built up a high degree of acquired immunity, have later compromised it for the same reasons, may become susceptible to the infection as if they had never been immunized, or been immunized only to a very insufficient extent; and that, as a matter of fact, the individuals belonging to this group, *viz.*, those in whom infection is to be feared, constitute only a minority.

That the agency of transmission resides almost exclusively in the pulmonary expectoration of consumptives; that a patient who expectorates in a cleanly manner, who

collects his sputum in a receptacle which permits of its subsequent destruction, and lets no particles of sputum become disseminated over his person and about him, is, practically, not a source of infection; that persons may consequently live near consumptives and care for them without any exaggerated apprehension, provided that there be created about them a hygienic environment—in brief, the special hygiene of consumptives—and that the co-dwellers take care to keep their own bodies in a healthy condition. These facts have been amply proven by experience in sanatoriums. In such institutions infection of the personnel does not occur; what is witnessed, on the other hand, is the employee who, more or less tuberculous and in poor general condition upon his arrival, is restored within a few weeks to a highly satisfactory state of health. In the hygienic environment in which the consumptives are placed the chances of transmission of the disease are so effectually reduced to a minimum that both the patients and the healthy are far better protected from the disease than in any other places to which they go without the least thought of danger, places in which ordinary, everyday lives are lived, places too often unwholesome and constituting distinct foci whence tuberculous infection is disseminated.

That, in spite of the fact that acquisition of the disease is but little to be feared by most people, we should nevertheless continue to institute with the utmost vigor measures to control the expectoration of consumptives, not only *because the sputa infect persons who, while constituting only a minority, are receptive to the tubercle bacillus,* but also because they contribute to the maintenance and increased contamination of the bacillus-laden medium we breathe and into which all newborn children are thrown without the least special precaution against tuberculous infection.

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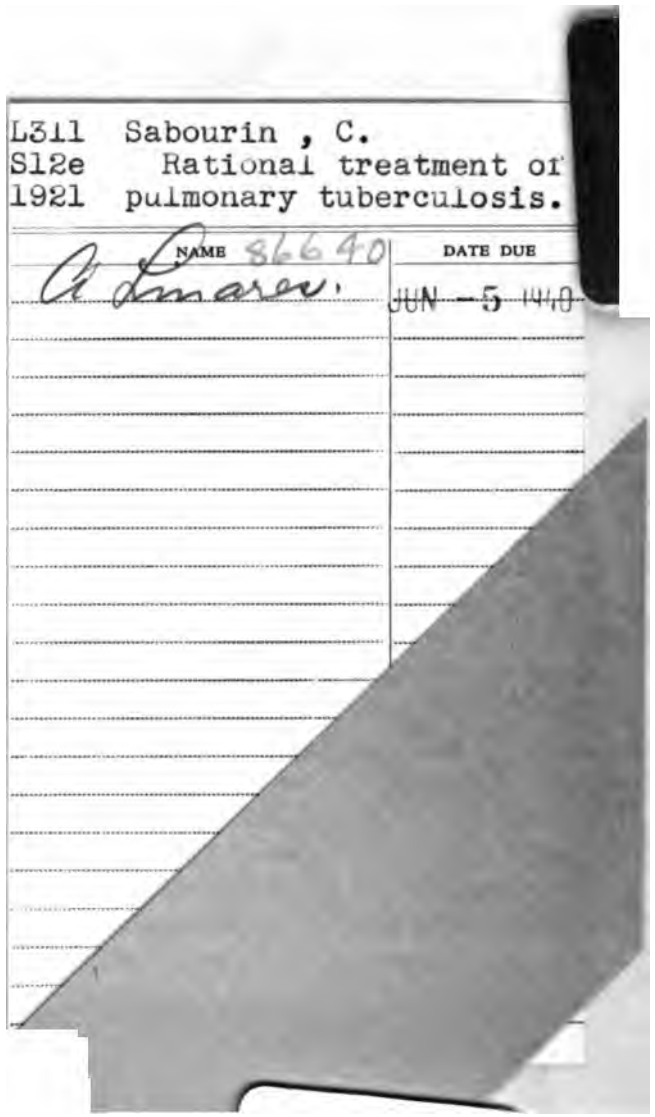

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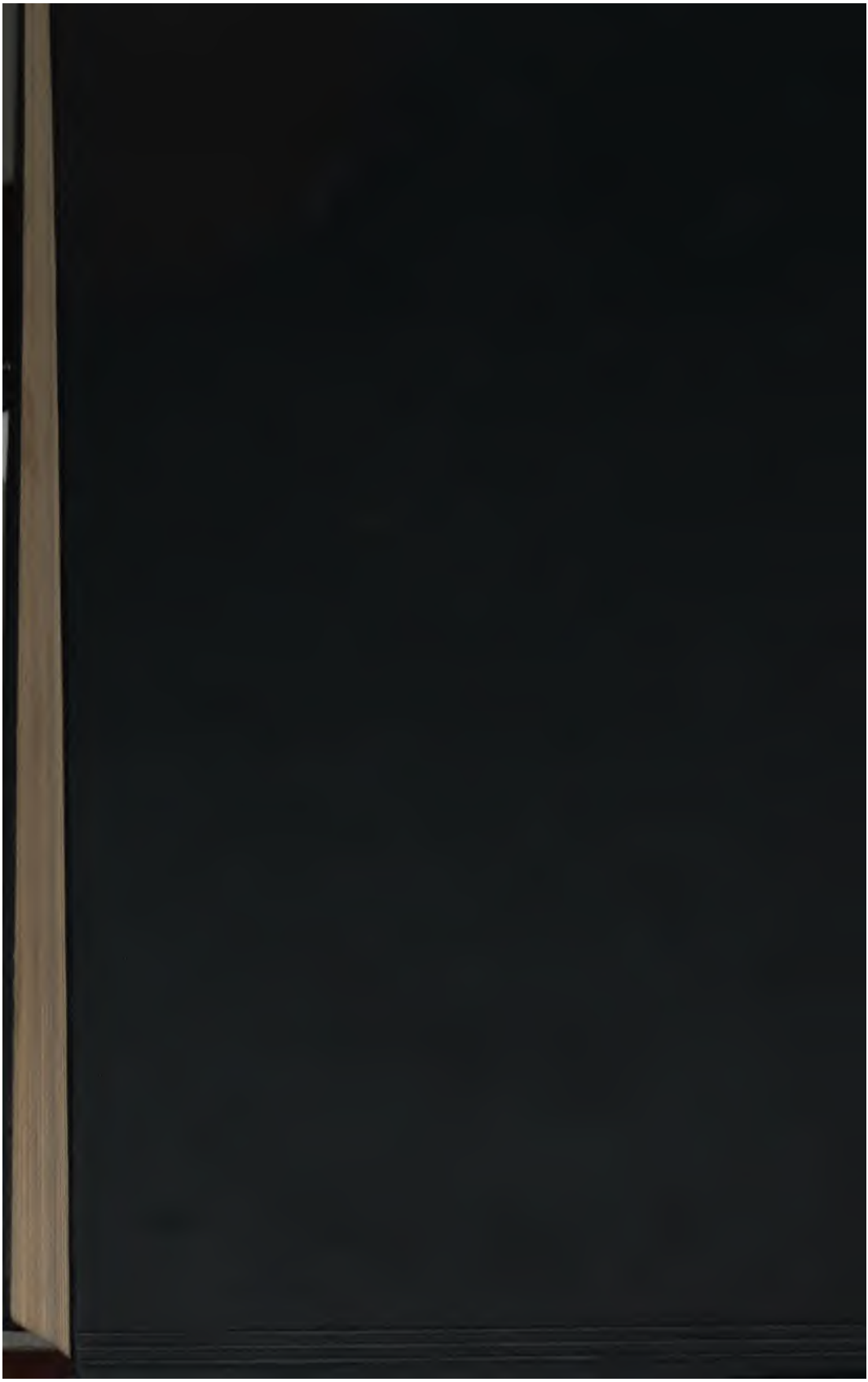
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